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## A MONOGRAPH OF THE GENUS BAPTISIA1

#### MARY MAXINE LARISEY

Instructor in Botany, Wellesley College
Formerly Instructor in Botany, Henry Shaw School of Botany of
Washington University

## Introduction

Baptisia is a perennial herbaceous member of the Leguminosae which has been variously treated in different taxonomic publications. Small, who treated the group most thoroughly, placed it in the tribe Podalyrieae of the Fabaceae. It was included within the Podalyrieae, a subdivision of the Papilionaceae, by Britton and Brown. Gray's "Manual" regards it as a member of the Papilionoideae, a sub-family of the Leguminosae.

The genus Baptisia is confined to the eastern half of North America, embracing the general area from Maine to Florida, west to Minnesota, and south to Texas. Baptisia tinctoria and B. leucantha have been reported from Ontario, B. Nuttalliana and B. minor from Mexico adjacent to Texas; but such reports are rare as the genus is essentially one of the United States. In number of species it is most abundant in the eastern and southeastern states. Westward from the coast the number in-

<sup>&</sup>lt;sup>3</sup> An investigation carried out in the Graduate Laboratory of the Henry Shaw School of Botany of Washington University and submitted as a thesis in partial fulfillment of the requirements for the degree of doctor of philosophy in the Henry Shaw School of Botany of Washington University.

creases with the rising uplands and dwindles beyond the Appalachian range to fewer species but to a distinct group differing considerably from the extreme eastern and southeastern types. The genus is well represented throughout the Mississippi Valley, but there have been no collections west of the Rocky Mountains.

Taxonomically, the genus has gradually passed into a rather complicated state of affairs. The first species described were of the eastern states. As the country developed westward and more specimens were collected, attempts were made to fit them into the first descriptions. Frequently the plants in question were entirely new entities. In time the original descriptions were modified to include the newer types, and in a few instances the later collections outnumbered the earlier ones to such an extent that the true nature of the species as originally described was lost.

It was with the idea of straightening out as many of these problems as possible that the present investigation was undertaken. Herbarium material of the Missouri Botanical Garden constituted the principal basis for the study. In addition visits were made to Notre Dame University, the Field Museum of Natural History, the Gray Herbarium of Harvard University, the New York Botanical Garden, the Academy of Natural Sciences of Philadelphia, the United States National Museum, and the Charleston (S. C.) Museum, for the examination of type specimens and authentic material of the earlier species. Through the Missouri Botanical Garden loans were secured from twenty other American herbaria.

The examination of the above-mentioned material has resulted in a revised classification, the separation of several species into two or three categories, and the recognition of six new species, eight new varieties, and one new form. The discovery of eight clear-cut cases of hybridism, and a few additional suspected ones, contributed immeasurably to the solution of many problems. Species for which insufficient data are available have been relegated to a list of doubtful species.

Sincere appreciation is expressed to Dr. J. M. Greenman, Curator of the Herbarium of the Missouri Botanical Garden, who suggested the problem and under whose guidance the work has progressed; and to Dr. George T. Moore, Director of the Missouri Botanical Garden, for the privileges afforded in the use of the library and herbarium. Thanks are due also to those in charge of the herbaria of those institutions whose specimens were made available; and to those in charge of the following institutions for the loans of books and photographic copies of references: Gray Herbarium of Harvard University, United States Department of Agriculture Library, and Musèum d'Histoire Naturelle. The author is extremely grateful to all who made special collections in the southeastern states and to temporarily inaccessible regions during the course of this investigation. Without this willing assistance the solution of many problems would have been impossible.

### TAXONOMIC HISTORY OF THE GENUS

Under the generic names of Crotalaria and Sophora Linnaeus published four species which have been absorbed by Baptisia. These are: Crotalaria alba and C. perfoliata,¹ and Sophora tinctoria, 1753,² and S. australis 1784.³ In 1788 Walter⁴ added two more under Sophora, namely S. lanceolata and S. villosa. Sophora australis was transferred to Podalyria by Willdenow⁵ in 1799; and in 1803 Michaux⁶ placed the other five in Podalyria, treating S. lanceolata Walt. as a synonym of P. uniflora Michx.

Ventenat<sup>7</sup> founded the genus *Baptisia* in 1808, basing his description on *Sophora alba* L. and *S. tinctoria* L. These two species were cited by him but were not accompanied by specific descriptions.

In 1811 Robert Brown<sup>8</sup> recognized Baptisia as a valid genus

<sup>&</sup>lt;sup>1</sup> Linn. Sp. Pl. 2: 716, 714. 1753.

Linn. Sp. Pl. 1: 373, 1753.

<sup>&</sup>lt;sup>a</sup> Linn. Syst. Veg., ed. 14, 391. 1784.

Walt. Fl. Car. 134, 135. 1788.

Willd. in Linn. Sp. Pl., ed. 4, 2: 503. 1799.

Michx. Fl. Bor. Am. 1: 263-265, 1803.

Vent. Dec. Gen. Nov. 9, 1808.

<sup>&</sup>lt;sup>8</sup>R. Br. in Ait. Hort. Kew., ed. 2, 3: 5, 6. 1811.

and referred thereto B. alba, B. tinctoria, B. australis, and B. perfoliata, giving a complete description of each species.

Nuttall, in 1818, treated Baptisia as a valid genus indigenous to North America, listed eight species, and added a new one, B. leucophaea. His B. caerulea is synonymous with B. australis, and B. mollis has since been transferred to Thermopsis. In 1821 Elliott 10 described B. uniflora Nutt. more fully as B. lanceolata and this specific name has stood since then. At the same time he described a new species, Baptisia bracteata, based on Podalyria bracteata Muhl.

Crotalopsis Michx. was designated as a generic synonym of Baptisia by DeCandolle<sup>11</sup> in 1825.

In 1837 Rafinesque <sup>12</sup> proposed four generic names—Eaplosia, Lasinia, Pericaulon, and Ripasia—for different entities of Baptisia, adding a few new specific descriptions. Neither the generic nor specific names have ever been recognized as anything but synonyms of Baptisia.

Torrey and Gray<sup>13</sup> described a new species, *B. leucantha*, in 1840, which is one of the dominant members of the group, having a distribution from Ontario to Minnesota, south to Louisiana and Texas.

From time to time several other new species have been described, most of them more or less localized in rather small areas; but no attempt will be made to go into a detailed account of their history. The species noted above are the typical representatives of the group; and, except for a few isolated species of doubtful status, they are the ones about which the greatest confusion has existed.

### GENERAL DISCUSSION OF PROBLEMS AND CONCLUSIONS

1. Baptisia australis-B. minor complex: B. australis has for many years been the classical "dumping ground" for material collected in the Middle West. There can be little doubt as to the

<sup>\*</sup> Nutt. Gen. N. Am. Pl. 1: 281, 282. 1818.

<sup>&</sup>quot;Ell. Sketch Bot. S. Car. & Ga. 1: 467, 469. 1821.

<sup>&</sup>lt;sup>2</sup> DC. Prodr. 2: 100, 1825.

<sup>&</sup>lt;sup>23</sup> Raf. New Fl. N. Am. 2: 47-52. 1836 [1837].

<sup>&</sup>quot; Torr. & Gray, Fl. N. Am. 1: 385. 1840.

true nature of *B. australis* because for no other species is there such a wealth of literature, copiously illustrated. As originally described, it is a beautiful blue-flowered, large-leaved, simple- and erect-branched species of the eastern states and responds very well to cultivation. Early in the nineteenth century it was introduced into European gardens, especially in England and France. This fact, incidentally, paved the way for a number of problems in synonymy as it was given a number of new names abroad. A comparison of illustrations and descriptions, however, leaves no question as to their identity.



Fig. 1. Baptisia australis-B. minor complex; B. villosa.

Throughout the Middle West a blue-flowered, smaller-leaved, dichotomously and divaricately branched plant was found in great abundance and was accepted as *B. australis*. For many years this smaller type has been taken for *B. australis*, and at least four-fifths of the material examined in the course of this investigation proved to be the plant of questionable status. A comparison with authentic *B. australis* makes it very clear that the more western type is specifically distinct. Discovery of the type specimen of *B. minor* Lehm. in the Gray Herbarium indicates that this fact was recognized as early as 1827.

However, Lehmann's name has been universally regarded as a synonym of *B. australis*. In 1861, it was again described as *B. texana* by Buckley; but this name was not even generally honored as a synonym of *B. australis*. Not until 1932, when Small, in Rydberg's "Flora of the Prairies and Plains of Central North America," described a new species, *B. vespertina*, from Missouri, Kansas and Texas, was any widespread cognizance of its existence manifested. But Small's name, which has been recognized in the last few years, must go into syn-

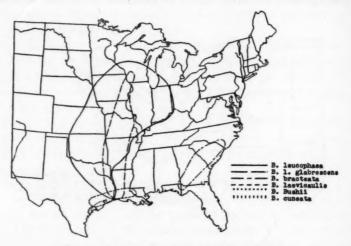


Fig. 2. Baptisia bracteata-B. leucophaea complex.

onymy along with B. texana Buckl. The true B. australis extends from Pennsylvania to southern Indiana, south to virginia and Tennessee. It has been introduced in Vermont.

2. Baptisia bracteata-B. leucophaea complex: In the mannals, B. bracteata and B. leucophaea were treated as conspecific for several years and recognition was given to the earlier name, B. bracteata. In 1903, Small 14 recognized them as two distinct species, and his recognition has since been substantiated by most taxonomists. In a paper read by Dr. J. M.

<sup>34</sup> Small, Fl. Southeast. U. S., ed. 1, 600, 601. 1903.

Greenman<sup>15</sup> before the Illinois State Academy of Science at the East St. Louis meeting in May, 1933, the following differences were pointed out:

B. bracteata (Muhl.) Ell.

1. Leaflets mostly 6-10 cm. long.

2. Pedicels mostly less than 1.5 cm. long.

Pod not strongly reticulated, sparsely subappressed-pubescent.

4. Plants of North Carolina and Geor-

B. leucophaea Nutt.

Leaflets averaging somewhat smaller.

Pedicels more than 1.5 cm. long.

Pod strongly reticulated, densely spreading-pubescent.

Plants of Central United States.

Further differences are indicated in the taxonomic section. A variety of B. leucophaea, B. leucophaea Nutt. var. laevicaulis, from Louisiana and Texas, was proposed by Gray<sup>16</sup> in 1873, but no description accompanied the name; it was first described by Canby<sup>17</sup> in 1879. In 1895 Small<sup>18</sup> raised it to specific rank, describing it as B. laevicaulis. It has been confused with a glabrate variety of B. leucophaea, more extensive in range. The present treatment recognizes B. laevicaulis Small, and proposes for the more widespread type the name B. leucophaea var. glabrescens.

3. Unique species of the southeastern states: The southeastern states present a group of species in which there is marked fluctuation in morphological characters. Within this area there is a number of endemic species, especially in Florida but extending into South Carolina, Georgia and Alabama, which reveals rather interesting transitional stages, particularly in leaf characters. Trifoliolate, stipulate leaves are the rule in the genus and are invariably found in the species throughout the remainder of the distribution area. In the sandhills along the coastal plains of South Carolina and Florida, there is a species, B. microphylla, the lower leaves of which are trifoliolate and stipulate, the upper ones frequently simple, entire, clasping, or perfoliate. The transition is quite apparent for it

<sup>&</sup>lt;sup>38</sup> Greenm. False Indigoes of the Mississippi Valley. Read at E. St. Louis meeting of Ill. State Acad. Sci. May, 1933.

<sup>&</sup>quot;Hall's Pl. Texas 7, 1873.

<sup>&</sup>quot; Bot. Gaz. 4: 132, 1879.

<sup>&</sup>lt;sup>38</sup> Bull, Torr. Bot. Club 25: 134. 1895.

is possible to trace the gradual fusion of the stipules with the lower leaflets and of the leaflets themselves from the base of the stem upwards. In the same type of locality, but in a more extensive area, occurs a species, B. perfoliata, in which the perfoliate habit is definitely established. The pinelands of central Florida vield a species, B. simplicifolia, which has simple. entire, sessile leaves without stipules. A close degree of relationship apparently exists between these aberrant forms and the B. sphaerocarpa-viridis complex in Louisiana, Arkansas, Texas and Oklahoma. The leaves of B. sphaerocarpa are normal, i.e., trifoliolate; however, while the lower leaves of B. viridis are trifoliolate, the upper ones, and those terminating the lateral branches, are frequently bifoliolate and ultimately unifoliolate. There are no fusion stages apparent. Further evidence of this affinity is found in the mature pods which are ligneous, quite thick, and subglobose as in B. perfoliata. Accompanying this common pod character, there is a tendency toward a distinct ferruginous coloring in B. perfoliata, B. sphaerocarpa, and B. viridis, instead of the blackening characteristic of most of the other species.

Another interesting group in this area consists of B. Le-Contei, native of the pinelands and scrub along the coastal plains of Georgia and Florida; B. calycosa from the pinelands of eastern Florida; and B. hirsuta, endemic to the dry sandy pinelands of western Florida. All three differ from the rest of the species in the possession of a pair of bractlets slightly above the middle of the pedicel in addition to the solitary subtending bract, which is a constant character within the group. They are distinguished also by unique calyx characters, a fact which prompted Small to place them in a separate tribe, Calycosae. Throughout the genus the calyx is normally campanulate, the lobes shorter than the tube. B. LeContei retains the campanulate character, departing from the prevailing type only in the elongated lobes which are about equal to the tube in length. But B. calycosa and B. hirsuta have a very reduced calvx-tube and conspicuous foliaceous lobes at least four times the length of the tube, frequently completely obscuring the corolla.

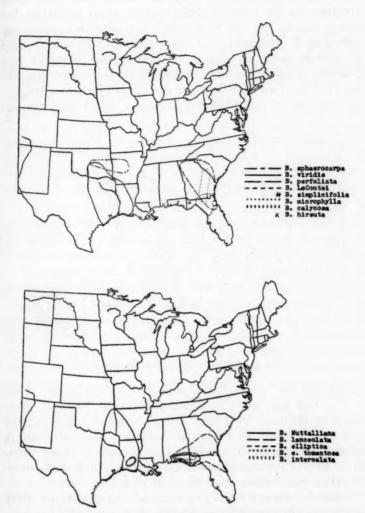


Fig. 3. Southeastern-southwestern affinities of Baptisia.

The affinities of B. leucantha in South Carolina, Georgia, Florida and Alabama furnished one of the most perplexing problems in the present study. After much hesitation the group, which, for the most part, has been heretofore accepted as B. leucantha, was separated into two new species: B. psammophila, principally of Florida but extending into Georgia; and B. pendula of Georgia, South Carolina and northern Florida. Two varieties were assigned to the latter species: var. obovata of central South Carolina, with reasonable cer-

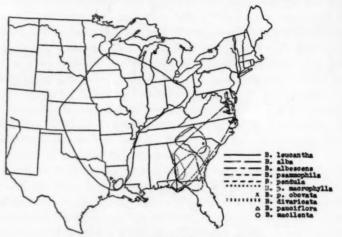


Fig. 4. Baptisia alba-B. leucantha complex,

tainty, and var. macrophylla, with considerable doubt. It occurs in Georgia, but a specimen found near Paducah, Kentucky, is identical with it. Further collections and detailed field study in the southeastern states are necessary before entirely satisfactory disposition can be made of these forms. In the light of specimens now in the major herbaria of the country, these conclusions seem the most plausible.

A new species and variety from along the Ochlockonee River in Florida have also been proposed: B. riparia, and var. minima. They are reminiscent of the leucantha alliance in that both blacken in drying; but the resemblance is only superficial as it is clearly distinguished on the basis of several characters.

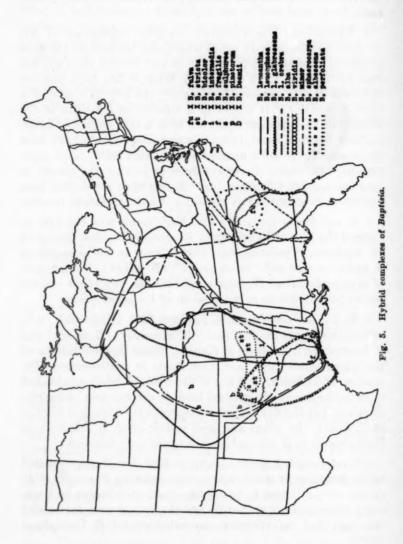
The racemes are short, the flowers yellow, and the ovary pubescent.

- 4. Hybridism: The relatively frequent occurrence of hybridism, particularly in areas where the borders of the geographical ranges of some of the larger species overlap, has been the basis of much confusion. When it has been possible to establish with reasonable certainty the hybrid origin of a form, especially if it recurs in a number of localities in the vicinity of the suspected parents with a fair degree of intermediacy between them, binomials and descriptions have been proposed. There are a number of suspected cases, a few quite certain; but where direct evidence is lacking the plants in question are left "in statu quo" if they have previously been described, or described as novelties if not heretofore treated.
- × B. sulphurea Engelm.: Dr. Engelmann was the first to suggest the idea of hybridity in Baptisia in his description of B. sulphurea, pointing out that it grew in the presence of B. sphaerocarpa and "B. australis" (B. minor). Comparison of type material of B. sulphurea with the two other species leaves little doubt as to the wisdom of his assumption.
- × B. bicolor Greenman & Larisey: Dr. Hitchcock<sup>20</sup> next called attention to the fact that "B. australis" (B. minor) and B. leucophaea hybridized in Kansas. Since then collections of the intermediate form have been made in southwestern Missouri and Oklahoma. It is one of the most definitely established cases in the genus. In general habit it more nearly resembles B. minor, but the flowers are bicolorous: the standard blue as in B. minor, the wings and keel yellow as in B. leucophaea. Back-crosses to B. leucophaea are apparently common.
- × B. intermedia Larisey: In April, 1936, Dr. Harper<sup>21</sup> called to the attention of the author a case involving B. viridis ("B. sphaerocarpa") and B. leucophaea var. glabrescens in Louisiana. Specimens of B. viridis and the hybrid were forwarded for study, but unfortunately no collections of B. leucophaea

<sup>&</sup>quot; Engelmann, G. in Bot. Gaz. 3: 65. 1878.

<sup>&</sup>quot;Hitchcock, A. S. in Bot. Gaz. 19: 42. 1894.

<sup>\*</sup> Harper, R. M. in Torreya 38: 121-124. 1938.



var. glabrescens were made at the time. Photographs taken in the field, and a specimen collected from the same locality several years ago, however, leave no doubt as to its identity.

- × B. stricta Larisey: The parents of this hybrid are apparently B. leucophaea and B. sphaerocurpa. This particular set-up has solved one of the greatest problems in the group. B. villosa (Walt.) Nutt., a southeastern coastal-plain species, has been reported in the manuals as occurring also in Arkansas. It has been generally supposed that these reports have been based on incorrect determinations of B. Nuttalliana. However, the discovery of specimens labelled "B. villosa" and collected by Nuttall in Arkansas dispelled that notion. The existence of several other questionable specimens from Texas and Oklahoma merely added to the confusion until careful study showed them to be intermediate between B. leucophaea and B. sphaerocarpa; and while there is more variability among them than in most of the other hybrids, there seems little doubt as to their status.
- × B. fragilis Larisey: In southeastern Texas Dr. E. Anderson collected excellent flowering material of B. viridis, B. leucantha, and a hybrid between them. This has been the most ideal complex of all because specimens were taken from about sixty plants, making possible detailed comparative study of morphological characters. Arbitrary index values were assigned to the most significant characters, and the index value of a plant equaled the sum of the values of its various characters. In this way it was possible to plot the entire lot on a chart which grouped the two species at the opposite ends of the table, the hybrids in the middle, and back-crosses scattered in the direction of the respective parent species. Pollen counts were also made, revealing a variable but higher percentage of bad pollen than in either of the parent species. Specimens obviously belonging to similar complexes were found from another locality in Texas, and in Louisiana.
- imes B. Deamii Larisey: Through the kindness of Mr. C. C. Deam, study of a case of hybridism between B. tinctoria var. crebra and B. leucantha in low sandy woods in northern Indiana was made possible. This problem is one of the few where

ample fruiting as well as flowering material has been available.

× B. pinetorum Larisey: A similar complex exists in a sandy pine woods in Accomac County, Virginia, between B. tinctoria var. crebra and B. alba. Collections of B. tinctoria var. crebra from this region are quite rare, but two specimens have been seen which are apparently authentic. The rest of the material is of B. alba, the hybrid, and back-crosses mostly to B. alba. While several specimens from this section are in a number of herbaria, a gift of a set of twenty specimens from



Fig. 6. Baptisia tinctoria complex; B. riparia and B. megacarpa.

Dr. Robert R. Tatnall and Dr. Frank M. Jones was an invaluable aid to the investigation.

× B. fulva Larisey: This hybrid occurs in the sand hills around Augusta, Georgia, and collections of it and the two parents—B. albescens and B. perfoliata—were made in 1900 by Mr. A. Cuthbert. The three specimens are in the herbarium of the New York Botanical Garden.

Suspected cases of hybridism for which there is no definite proof are B. microphylla, a probable cross between B. perfoliata and B. tinctoria; and B. Serenae, which has many characters intermediate between B. alba and B. tinctoria. However,

the known hybrid between these two species is quite distinct from B. Serenae; and if it be of such remote origin, some other element has exerted a strong influence in the course of its evolutionary development.

Two new species are described herein from southern Louisiana, a region particularly rich in diverse forms, and where at least two cases of hybridism are known. B. intercalata, which is closely related to B. Nuttalliana, suggests hybridity; but there is no evidence. B. macilenta resembles  $\times B.$  fragilis very strongly, but has a slightly pubescent pod; but there is undoubtedly an affinity with B. leucantha. Two new varieties of B. leucantha from this same area (var. divaricata and var. pauciflora) seem to bear a close relationship with B. macilenta, but are glabrous as is the true species.

### GROSS MORPHOLOGY

Reot: The roots are of the fibrous type and are not distinguished by any outstanding character peculiar to the group.

Stem: The underground stems consist of rather large, woody, perennial rhizomes which give rise to the aerial portion of the plant each year. The upright stems are usually terete, ribbed, stout or slender, succulent or firm, glabrous or pubescent, frequently glaucous; they are usually erect, but occasionally declining, sparingly or more often widely branched, the branches simple and erect, geniculate, or subdichotomous and divaricate.

Leaves: The leaves are typically ternately compound, subsessile to petiolate, stipulate, glabrous or pubescent, frequently glaucous on the lower surface; the leaflets are subsessile to petiolate, varying from broadly elliptic, narrowly elliptic, oblanceolate, obovate, to rhombic cuneate, apex acute to obtuse; the stipules vary from minutely setaceous, through deltoid, triangular-lanceolate, to large-foliaceous and may be persistent or caducous. In a few species the leaves are simple, sessile or perfoliate, without stipules.

Flowers: The flowers are perfect and normally borne in loose terminal or axillary racemes; occasionally they occur singly in the axils of the upper leaves.

Floral bracts: The floral bracts are lanceolate-setaceous to ovate-acuminate, foliaceous, deciduous or persistent.

Pedicels: The flowers are always pedicellate, the pedicels usually rather slender, varying in length from 1 to 4 centimeters.

Calyx: The calyx is almost universally campanulate, bilabiate, four- or five-parted; the upper lip may be entire, ovate or truncate, emarginate, or two-lobed; the lower lip is distinctly three-lobed, lobes deltoid-ovate to lanceolate, acuminate, usually shorter than the tube. Occasionally the calyx-tube is greatly reduced and the lobes assume a large foliaceous habit.

Corolla: The corolla is papilionaceous, irregular, the five parts arranged in the following manner: the upper one, standard or vexillum, broad and usually laterally reflexed, emarginate or entire, occasionally auriculate at the base; the two lateral ones, wings, enclosing the two lower ones which are more or less united to form the keel—the keel curving upward. The petals are more nearly equal in length than in most leguminous genera, but the standard is usually shorter than the others. The petals are deciduous.

Stamens: There are ten equal stamens, distinctive in that they are not united into a tube at the base. They are also deciduous.

Ovary and Mature Fruit: The ovary is superior, short-stipitate, with an incurved style and simple stigma, and may be glabrous or pubescent. The mature fruit is unilocular, unicarpellary, many-seeded, dehiscent, short- or long-stipitate, gradually or abruptly beaked, usually inflated, ligneous-coriaceous or rarely membranaceous, globose, ovoid, elliptic, oblongoid or cylindric, glabrous, strigillose, or pubescent.

### GENERIC AFFINITIES

Baptisia is most closely allied to the following genera, and has been involved with them in questions of synonymy: Thermopsis, Sophora, Crotalaria and Podalyria.

Thermopsis is a perennial herbaceous genus native of North America and Asia. In the United States it seems to have taken the place of *Baptisia* in the Far West. Its chief differences from *Baptisia* are found mainly in fruit characters: the pod is sessile or very short-stipitate, flat rather than inflated, and is linear or oblong, straight or curved.

Sophora is a rather widespread genus—shrubs or herbs in the temperate regions, and trees in the tropics. It is characteristic in having odd-pinnate leaves; a campanulate calyx which is very shortly five-toothed, at times the upper margin being almost entire; and the fruit is constricted between the seeds and indehiscent.

Crotalaria consists chiefly of tropical herbs, and the stipules are characteristically decurrent on the stems and branches, a condition never found in *Baptisia*; the calyx is bilabiate with a prominently two-lobed upper lip and a deeply three-lobed lower lip; the pod is globular to cylindric and the seeds loosen, giving the genus the common name Rattlebox.

Podalyria, the genus with which all the early Baptisia species were associated, is now restricted to a group of African shrubs which have united persistent stamens.

## ECONOMIC VALUE

For a number of years certain species of Baptisia, especially B. tinctoria, constituted the source of a substitute for indigo. This fact contributed the generic name, as the word Baptisia comes from the Greek "βαπιζειν," meaning to dip or dye. The Baptisias are frequently called False Indigoes. Indigofera is now used to a limited extent for the production of indigo, and Baptisia plays very little part in the industry today.

## ABBREVIATIONS OF HERBARIA

MBG-Missouri Botanical Garden.

USN-United States National Museum.

GH-Gray Herbarium of Harvard University.

NYB-New York Botanical Garden.

ANSP-Academy of Natural Sciences of Philadelphia.

FM-Field Museum of Natural History.

UP-University of Pennsylvania.

UNC-University of North Carolina.

DU-Duke University.

CM-Charleston Museum.

CA-Clemson Agricultural College.

UF-University of Florida.

UG-University of Georgia.

OU-Ohio State University.

LB-Dr. E. Lucy Braun.

IU-Indiana State University.

CD-Charles C. Deam.

ND-University of Notre Dame.

LU-Louisiana State University.

TU-Tulane University.

UM-University of Minnesota.

UW-University of Wisconsin.

UN—University of Nebraska.

KA-Kansas State Agricultural College.

UO-University of Oklahoma.

OAM-Oklahoma Agricultural and Mechanical College.

UT-University of Texas.

NM-New Mexico College of Agriculture and Mechanical Arts.

### TAXONOMY

Baptisia Vent. Dec. Gen. Nov. 9. 1808; R. Br. in Ait. Hort. Kew., ed. 2, 3: 5. 1811; Ell. Sketch Bot. S. Car. & Ga. 1: 466. 1821; DC. Prodr. 2: 100. 1825; Chapman, Fl. South. U. S., ed. 1, 110. 1860, ed. 2, 110. 1889, and ed. 3, 120. 1897; Torr. & Gray, Fl. N. Am. 1: 383. 1840; Benth. & Hook. Gen. Pl. 1: 466. 1862-67; Hoffm. in Engler & Prantl, Nat. Pflanzenfam. III. 3: 200. 1894; Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 265. 1897, and ed. 2, 2: 344. 1913; Small, Fl. Southeast. U. S., ed. 1, 597. 1903, and ed. 2, 597. 1913; Gray, New Man. Bot., ed. 7, 505. 1908; Rydb. Fl. Prairies and Plains Central N. Am. 455. 1932; Small, Man. Southeast. Fl. 674. 1933.

Crotalaria Dill. ex Linn. Gen. Pl., ed. 1, 218. 1737, in part. Sophora Linn. Gen. Pl., ed. 1, 125. 1737, in part. Podalyria Lam. Illust. 2: 454. pl. 327, fig. 3, 4. 1793, in part. Crotalopsis Michx. ex DC. Prodr. 2: 100. 1825, in syn. Eaplosia Raf. New Fl. N. Am. 2: 51. 1836 [1837]. Lasinia Raf. New Fl. N. Am. 2: 48. 1836 [1837].

Pericaulon Raf. New Fl. N. Am. 2: 50. 1836 [1837].

Ripasia Raf. New Fl. N. Am. 2: 48. 1836 [1837].

Perennial herbs with stout, woody rhizomes. Plant usually darkening, occasionally blackening, rarely remaining unchanged in drying, glabrous throughout, somewhat glaucous,

or minutely to densely appressed-pubescent throughout or in parts, sometimes villous, rarely hirsute. Stems usually erect, occasionally declined, stout-succulent or slender-firm, terete, heavily to lightly ribbed, sheathed at the base with conspicuous scales; branches arising alternately from a single primary stem, or main stem diffusely branching from the base, secondary branches subdichotomous, geniculate or straight, ascending, divaricate, or lateral ones sometimes declined. Leaves alternate, usually trifoliolate, occasionally bifoliolate, simple or perfoliate, sessile to petiolate, usually stipulate, stipules minute, setaceous, lanceolate to ovate-cordate and foliaceous, persistent or deciduous; leaflets usually sessile, occasionally shortpetiolate, obovate, oblanceolate to lanceolate, elliptic or rhombic, usually cuneate, apex acute, rounded, obtuse, retuse or slightly mucronate, firm or delicate. Flowers perfect, normally borne in terminal, axillary, or rarely intercalary racemes, occasionally borne singly in axils of the upper leaves; floral bracts setaceous-lanceolate to ovate-acuminate, foliaceous, deciduous or persistent; pedicels slender; calvx campanulate, bilabiate, four- to five-parted, upper lip entire, emarginate or two-lobed, lower lip distinctly three-lobed, lobes usually shorter than the tube, occasionally three to four times longer; corolla white, cream, yellow, blue or bicolorous, irregular, papilionaceous; petals 5, deciduous, standard reniform or suborbicular, usually laterally reflexed, occasionally auriculate, wings and keel erect, about equal in length; stamens ten, distinct, deciduous; ovary superior, stipitate, style incurved, stigma simple. Mature pod globose, ovoid, elliptic, oblongoid or cylindrical, usually inflated, ligneous to membranaceous, smooth, rugose or strongly reticulate, many-seeded, short- or long-stipitate, short- or long-beaked, beak incurved.

Distribution: North America: Vermont to Florida, west to Minnesota, south to Texas.

Type species: Baptisia alba (L.) Vent.

#### KEY TO THE SPECIES

2a. Lower l	eaves trifoliolate, upper bifoliolate and unifoliolate, all stipulate
*****	trifoliolate, stipulate
	les partially or wholly united with the leaflets
	aflets 2.5-3 cm. long, 1-1.5 cm. broad
	aflets 3.5-5.5 cm, long, 2-3 cm, broad
	les not united with the leaflets
	yx-lobes equal to the tube, or longer
	Calvx-lobes equal to the tube
	Leaflets 1.5-2.5 cm, long
	Leaflets 4-5 cm. long
	Calyx-lobes several times longer than the tube
	Plant essentially glabrous
	Plant hirsute
	lyx-lobes shorter than the tube
	Flowers both axillary and racemose
	Leaflets spatulate to oblanceolate
	Leaflets broadly elliptic
	1f. Lower leaf-surface glabrate
	2f. Lower leaf-surface tomentose11. B. elliptica var. tomentosa
	Leaflets obovate-cuneate
	1f. Racemes terminal
	2f. Racemes intercalary
	Flowers racemose
	. Flowers secund
10	1f. Racemes declined
	1g. Leaflets oblanceolate-elliptic, 5-10 cm. long, softly pubescent
	14. B. bracteata
	2g. Leaflets narrowly oblanceolate-spatulate, 3-10 cm. long, vil-
	lons
	1h. Stems villeus
	2h. Stems giabrous, or nearly so 16. B. leucophaea var. glabrescens
	3g. Leaflets rhombic-obovate, 4-7 cm. long, margins ciliate
	4g. Leaflets cuncate-obovate, 3-6 cm. long, margins not ciliate
	18. B. ouncata
	2f. Racemes not declined
	lg. Stems glabrous or glabrate
	2g. Stems finely villous
	3g. Stems woolly-tomentose
24	. Flowers not secund
-	1f. Flowers white
	1g. Pod cylindrical, yellow-brown
	1h. Leaflets 2-3 cm. long, lower surface glabrous-glaucous
	111. Deanets 2-5 cm. long, lower surface gindrous-giadcous
	2h. Leaflets 3.5-6 cm. long, lower surface finely pubescent
	23. B. albescens
	2g. Pod subglobose to elliptic-oblongoid, black
	1h. Racemes 1.5-2.5 dm. long, rarely exceeding the foliage
Y	

1i. Leaflets elliptic, apex acute, 4-6 cm. long, 1-2 cm. broad
2i. Leaflets obovate, 2-3.5 cm. long, 1-1.5 cm. broad
3i. Leaflets broadly elliptic-obovate, apex obtuse-rounded,
4-6 cm. long, 2-2.5 cm. broad
2h. Racemes 1-6 dm. long, exceeding the foliage
1i. Pod firm, inflated, smooth, rugose
1j. Branches ascending
2j. Branches divaricate
1k. Pod subglobose-ovoid, inequilateral
2k. Pod elliptic-oblongoid
2i. Pod thin, folded, strongly reticulate
30. B. psammophila
2f. Flowers cream or yellow
1g. Plant pubescent throughout
2g. Plant pubescent only in parts, essentially glabrous
1h. Racemes less than 1.5 dm. long
1i. Leaflets obovate-cuneate, less than 1.5 cm. long
2i. Leaflets obovate-lanceolate-cuneate, more than 1.5 cm.
long
3i. Leaflets spatulate-elliptic, 3-6 cm. long38. B. macilenta
4i. Leaflets obovate-lanceolate, 3.5-7 cm. long
1j. Leaflets glabrous
2j. Leaflets pubescent along midvein
40. B. riparia var. minima
5i. Leaflets broadly elliptic, 4-5 cm. long41. B. megacarpa
2h. Racemes more than 1.5 dm. long
1i. Pod firm but thin, rugose-reticulate
1j. Pod black
1k. Leaflets oblanceolate-cuneate, 1.5-4 cm. long
2k. Leaflets broadly obovate, 2.5-4.5 cm. long
2j. Pod yellow- to purplish-brown
1k. Leaflets obovate, obtuse-rounded36. × B. pinetorum
2k. Leaflets oblanceolate-elliptic, acute-rounded
2i. Pod ligneous, smooth
1j. Calyx-lobes lanceolate, nearly half the length of the
tube
1k. Branches straight, leaflets 4.5-8 cm. long
42. B. sphaerocarpa
2k. Branches geniculate, leaflets 2.5-5 cm. long
43. B. viridis

- 2j. Calyx-lobes deltoid-ovate, one-fourth to one-third the length of the tube

  - 2k. Stipules lanceolate, 0.7-1 cm. long, usually persistent, leaflets 3.5-5 cm. long........45.  $\times$  B. sulphurea
- 3f. Flowers blue
  - 1g. Branches ascending, leaflets 4-8 cm. long......46. B. australis
  - 2g. Branches divaricate, leaflets 1.5-5.5 cm. long
    - 1h. Plants of middle and southwestern United States. . 47. B. minor
      - 2h. Plants of North Carolina, Georgia and Tennessee.....
- 1. B. simplicifolia Croom in Am. Jour. Sci. 25: 74. 1834; Jour. Acad. Nat. Sci. Phila. 7: 96. 1834; Torr. & Gray, Fl. N. Am. 1: 383. 1840; Chapman, Fl. South. U. S., ed. 3, 120. 1897; Small, Fl. Southeast. U. S., ed. 1, 598. 1903, and ed. 2, 598. 1913; Small, Man. Southeast. Fl. 675. 1933.

Eaplosia ovata Raf. New Fl. N. Am. 2: 52. 1836 [1837].

Plant 1 m. or less high; stems firm, lightly ribbed, erect, much-branched, branches geniculate, ascending; leaves dark green, blackening in drying, simple, sessile, entire, margins revolute, blades firm, reticulate, glabrous, lustrous above, ovate, obtuse or retuse, 4-10 cm. long, 3-6 cm. broad; racemes terminal, compact, 1-2 dm. long; flowers pedicellate, pedicels 4-8 mm, long, the lowermost subtended by foliaceous bracts 1.5 cm. long, 1 cm. broad, the uppermost by smaller oblong or obovate persistent bracts 5 mm. long, 2 mm. broad; calyx campanulate, glabrous without, finely pubescent within, 5 mm. long, upper lip broad, entire or minutely cleft, lobes of lower lip ovate or oblong-ovate, 2.5-3 mm. long; corolla vellow, standard reniform, 1.2 cm. long, 1 cm. broad, wings and keel oblong, 1.5 cm. long; pod pubescent when young, glabrate at maturity, ellipsoid or ovoid, body 1-1.5 cm. long, long-beaked, beak slightly recurved, short-stipitate, stipe 4-6 mm. long.

Distribution: dry pinelands, Florida.

CITATION OF SPECIMENS:

FLORIDA: without definite locality, "Chapman mis. 1846" (MBG); Quincy, Chapman (USN,ANSP); "in pinetis ad Quincy," June, Chapman (GH); Quincy, 1835, Chapman (NYB); on Jackson Bluff road, Leon Co., 20 mi. west of Tallahassee, Aug. 1935, Kurz (MBG); near Quincy, coll. of 1833, Loomis & Croom (MBG, TYPE); in oak forest toward Springerag near Shellpoint, July, 1843, Ruget (MBG,

NYB); pinelands west of Ochlockonee River, Leon Co., Nov. 28, 1920, Small, Harper & Gunter 9671 (NYB,GH); white cedar swamp east of Bristol, July 12, 1924, Small, Small & De Winkeler 11450 (NYB); Black Jack oak serub, Quincy, Sept. 8, 1931, West (MBG).

2. B. perfoliata (L.) R. Br. in Ait. Hort. Kew., ed. 2, 3: 5. 1811; Ell. Sketch Bot. S. Car. & Ga. 1: 467. 1821; DC. Prodr. 2: 100. 1825; Lodd. Bot. Cab. 12: pl. 1104. 1826; Hook. Bot. Mag. II. 5: pl. 3121. 1831; Torr. & Gray, Fl. N. Am. 1: 383. 1840; Chapman, Fl. South. U. S., ed. 3, 120. 1897; Small, Fl. Southeast. U. S., ed. 1, 598. 1903, and ed. 2, 598. 1913; Small, Man. Southeast. Fl. 675. 1933.

Crotalaria perfoliata L. Sp. Pl. 2: 714. 1753. Sophora perfoliata Walt. Fl. Car. 135. 1788.

Rafnia perfoliata Willd. in L. Sp. Pl. ed. 4, 3: 949. 1800.

Podalyria perfoliata Michx. Fl. Bor. Am. 1: 263. 1803; Pursh, Fl. Am. Sept. 1: 307. 1814.

Pericaulon perfoliatum Raf. New Fl. N. Am. 2: 51. 1836 [1837].

Pericaulon cordatum Raf. New Fl. N. Am. 2: 51. 1836 [1837].

Plant less than 1 m. high, glabrous, somewhat glaucous; stems lemon- to tawny-yellow, widely branched, branches stiff, arching; leaves pale yellow-green, simple, perfoliate, mostly vertical, one-ranked due to alternate right and left torsion of the internodes, blades entire, leathery, orbicular to ovate, 5-10 cm. long, 3-8 cm. broad, rounded at both ends or notched at apex, finely reticulated; flowers axillary, solitary, pedicellate, pedicels 4-8 mm. long, ascending; calyx campanulate, densely pubescent within, 6-7 mm. long, upper lip usually deeply cleft, lobes deltoid, those of the lower lip ovate, 1.5-2.5 mm. long; corolla yellow, standard reniform, 0.8 cm. long, 1 cm. broad, wings and keel 1-1.3 cm. long; mature pods ligneous, rugose, ferruginous, ovoid to globose, 1-1.5 cm. long, 1 cm. broad, constricted at both ends, short-stipitate, stipe barely exceeding the calyx, abruptly short- and slender-beaked, beak usually breaking off.

Hybridizes with B. albescens in Georgia.

Distribution: sand hills and pine barrens, South Carolina to Florida.

CITATION OF SPECIMENS:

SOUTH CAROLINA: Aiken, May 1869, Canby (MBG,USN,GH,NYB,FM); Aiken, Aug. 1866, Ravenel (MBG); Aiken, June 1869, Ravenel (USN); Aiken, June and July 1870, Ravenel (NYB); Aiken, 1871, Ravenel (MBG); Aiken, June 1847, Wallace (CM).

GEORGIA: pine barrens, McRea, June 7, 1900, Biltmore Herb. 1600a (NYB); sandy soil, Summerville, July 21, 1905, Biltmore Herb. 1600b (UM); no definite locality, Chapman (USN); dry pine barrens, Oliver, July 6, 1901, Curtiss 6835 (MBG,GH,NYB,UM,UN,KA); open oak woods, sand hills, Augusta, May 1900, Cuthbert 178 (NYB); dry hills north of Belair, Richmond Co., May 22, 1899, Eggert (MBG); dry sandy soil at Butts, Emanuel Co., June 6, 1901, Harper 805 (MBG,USN,NYB); among sand hills between Grovetown and Forrest, Columbia Co., June 10, 1902, Harper 1310 (MBG,USN,GH,NYB); Louisville, May 1894, Hopkins 2935, 2984, § 2988 (MBG); no definite locality, April 1903, Prior ex Herb. Kew. (USN); dry sand hills 5 mi. east of McBean, Burke Co., April 10, 1838, Pyron § McVough 2457 (MBG); Augusta, Richmond Co., June 27-July 1, 1895, Small (NYB,UM); sandy pine barren hills north of Augusta, Sept. 21, 1883, Smith (USN); Wayeross, April, Williamson (NYB).

FLORIDA: sandy pine land, Chuluota, Seminole Co., May 18, 1929, Rapp 1

(NYB); sandy serub, Orlando, June 17, 1929, West (MBG).

3. B. microphylla Nutt. in Jour. Acad. Nat. Sci. Phila. 7: 97. 1834; Torr. & Gray, Fl. N. Am. 1: 383. 1840; Chapman, Fl. South. U. S., ed. 1, 111. 1860, and ed. 2, 111. 1889; Small, Fl. Southeast. U. S., ed. 1, 598. 1903, and ed. 2, 598. 1913; Small, Man. Southeast. Fl. 675. 1933.

Baptisia stipulacea Ravenel in Ell. Soc. Nat. Hist. 1: 38. pl. 2. 1856; Chapman, Fl. South. U. S. ed. 3, 121. 1897.

B. microphylla Nutt. var. axillaris Canby in Bot. Gaz. 4: 130. 1879.

B. perfoliata (L.) R. Br. var. lobata Canby in Bot. Gaz. 4: 130. 1879.

Pericaulon microphyllum Raf. New Fl. N. Am. 2: 51. 1836 [1837].

Plant 1 m. or less high, glabrous; stem widely branched, lateral branches arising from a single, erect, primary stem; leaves deep yellow-green, blackening in drying, lowermost ternately compound, petiolate, petioles 2–6 mm. long, uppermost simple, sessile, entire, clasping or semiamplexicaul, occasionally perfoliate, leaflets firm, reticulate, obovate, cuneate, or broadly spatulate, rounded at apex or apiculate, 2.5–3 cm. long, 1–1.5 cm. broad; persistent stipules foliaceous, ovate, variable in size, partially or wholly united with the leaf-blades;

flowers axillary or racemose, the latter subtended by cordate, foliaceous bracts 4 mm. long, 3 mm. broad; pedicels semipersistent, 0.8–1 cm. long; calyx campanulate, pubescent within, 5–6 mm. deep, upper lip entire, truncate or slightly emarginate, lobes of the lower lip deltoid, 2–2.5 mm. long; corolla yellow, standard 9 mm. high, 1 cm. broad, wings and keel 1–1.2 cm. long; pod brownish-black, somewhat glaucous, cartilaginous, ovoid, rarely subglobose, constricted at both ends, body 1–1.3 cm. long, stipitate, stipe 4–8 mm. long, short-beaked, beak recurved.

Distribution: sand hills, coastal plain, South Carolina to Florida.

#### CITATION OF SPECIMENS:

SOUTH CAROLINA: Aiken, May 1859, Buckley (MBG); Aiken, May 1869, Canby (MBG,USN,GH,NYB,FM); sand hills, Aiken, June, Ravenel (GH,TYPE of B. stipulacea Rav., CM); dry sandy soil, Aiken, Ravenel (MBG,USN,ANSP,FM); Aiken, June 1853, Herb. A. Gray, Ravenel (NYB); Aiken, June 1868, Ravenel (NYB); Aiken, June 1869, Ravenel (USN); Aiken, July 1870, Ravenel (NYB); Aiken, June 1878, Ravenel (ANSP); Aiken, coll. of 1880, Ravenel (USN).

FLORIDA: no definite locality, Nuttall (ANSP, TYPE, NYB).

## 4. × B. fulva Larisey, hyb. nov.22

## = B. $perfoliata \times B$ . albescens.

Height unknown; plant yellow-green throughout, drying deep tawny in parts; stem slender, firm, simply branched, branches ascending-spreading; leaves petiolate, petioles 3-7 mm. long, lowermost leaves trifoliolate, stipulate, stipules foliaceous, cordate-ovate, round at apex, amplexicaul, 0.5-2 cm. long, uppermost leaves bifoliolate to unifoliolate through irregular fusion of leaflets with stipules, leaflets obovate-cuneate, apex rounded to broadly acute, seldom retuse, 3.5-5.5 cm. long, 2-3 cm. broad; flowers axillary or in terminal racemes, racemes 1-1.5 dm. long; floral bracts foliaceous, cordate, acuminate, 0.5-1 cm. long; pedicels 3-5 mm. long; calyx-tube 5-6 mm. deep, upper lip truncate to slightly emarginate, lobes of the lower lip deltoid-ovate, 3 mm. long; corolla pale yellow, drying deep bronze, standard 1.2-3 cm. high, wings and keel

<sup>&</sup>lt;sup>28</sup> Inter perfoliatam et albescentem media: foliola 3, 2, vel 1, obovata cuneata apice rotundata raro retusa; flores axillares vel racemosi; corolla flavo-fulva.

1.4-5 cm. long; mature pod parchment-like, ferruginous, reticulate, cylindrical, 2-2.2 cm. long, 0.5-0.7 cm. broad, abruptly short-beaked, long-stipitate, stipe 5-7 mm. long.

Distribution: open sandy pine woods, central-eastern Georgia.

CITATION OF SPECIMENS:

GEORGIA: Waynesboro, 1860, Cleveland (UF); in open pine woods, sand hills, Augusta, May 25, 1900, Cuthbert 177 (NYB,TYPE, UF).

B. LeContei Torr. & Gray, Fl. N. Am. 1: 386. 1840; Chapman, Fl. South. U. S., ed. 3, 121. 1897; Small, Fl. Southeast. U. S., ed. 1, 598. 1903, and ed. 2, 598. 1913; Small, Man. Southeast. Fl. 675. 1933.

Plant 1 m. or less high, minutely pubescent; stem slender, firm, diffusely branched, branches geniculate; leaves bright yellow-green, retaining color in drying, lowermost shortpetiolate, petioles 2-4 mm. long, upper ones subsessile, leaflets cuneate-obovate to oblanceolate or spatulate, 1.5-2.5 cm. long, 1-1.5 cm. broad, margins revolute, apex usually slightly apiculate, rarely retuse; stipules minute, subulate, caducous, lower ones sometimes larger, 3-6 mm. long, 1 mm. broad, and persistent; racemes numerous, short, barely exceeding the foliage; pedicels slender, 2.5-3.5 cm. long, subtended by foliaceous, ovate bracts 7-9 mm. long, 3 mm. broad, and bibracteolate above the middle, bracteoles 3 mm. long, 1 mm. broad; calyx campanulate, 5-6 mm. deep, upper lip almost entire, lower lobes lanceolate or subulate-lanceolate, as long as the tube or longer, 3-4 mm. long; corolla yellow, standard suborbicular, 1 cm. high, 1 cm. broad, wings and keel 1-1.2 cm. long; pod yellow-brown to blackish, coriaceous, rugose or lightly reticulate, finely pubescent, ellipsoid, body 1.3 cm. long, up to 1 cm. broad, narrowed at both ends, stipe 5-7 mm. long, abruptly beaked, beak recurved.

Distribution: dry sandy plains, pine lands, and scrub, Georgia and Florida.

CITATION OF SPECIMENS:

GEORGIA: sandy soil, Twin Lakes, 12 mi. southeast of Valdosta, Lowndes Co., May 15, 1938, Berryman (MBG); no definite locality, Le Conte (NYB).

FLORIDA: high pine land, Jessamine, Pasco Co., May 4-18, 1897, Barnhart 2186 (FM); high pine land, Haines City, April 24, 1930, Blanton 6429 (USN,GH);

sandy fields near Jennings, Hamilton Co., June 6, 1930, Bright 4779 (CD); no definite locality, Chapman (USN,GH); Jacksonville, Chapman (NYB); Carrabelle, Oct. 1896, Chapman (MBG); dry pine barrens near Jacksonville, June, Curtiss 694 (MBG,USN,GH,NYB,FM,UM,UN); dry pine barrens near Jacksonville, May 30, 1894. Curties 4828 (USN,GH,FM,UM); no definite locality, ex Chapman, Curtis (GH); Waldo, Gilman 803 (USN); Wakulla Co., Aug. 12, 1924, Handley A 141 (USN); dry sandy pine barrens between Otter Creek and Panacea, Wakulla Co., July 19, 1925, Harper 49 (GH,NYB); dry sand barrens between Sopchoppy and Panacea, Wakulla Co., June 19, 1910, Harper 80 (GH,NYB,UM); high pine land, Columbia Co., 1898, Hitchcock (MBG); high pine land, Citrus Co., June-July, 1898, Hitchcock 356 (FM); Hernando Co., June-July, 1898, Hitchcock 357 (FM); between Medart and Panacea, Wakulla Co., May 5, 1935, Kurs (MBG); 3 mi. south of Woodville, Leon Co., May 29, 1935, Kurs (MBG); St. Nicholas, May 12, 1896, Lighthipe (WU,UM); south of Jacksonville, May 10, 1898, Lighthipe 228 (MBG, WU,UM); dry sandy field north of Palm Harbor, Pinellos Co., April 25, 1930, Moldenke 1039a (MBG, NYB, DU); dry sandy field, Elfers, Pasco Co., April 25, 1930, Moldenke 1061 (MBG,NYB,DU); in pinelands, Lake Jovita, April 18, 1927. O'Neill (MBG); "ad colles arenosos inter Volusia et Ft. Oclawaha, et prope Spring Garden," June-July, 1848, Rugel 191 (NYB); scrub near Weekiwachee Spring, April 22, 1922, Small 10413 (GH); sand hills west of Avon Park, De Soto Co., May 1, 1919, Small & De Winkeler 9085 (NYB); oak ridge between Suwannee River and Trenton, April 28, 1924, De Winkeler & Mosier 11328 (NYB); scrub between Perry and the Gulf of Mexico, near the mouth of Spring Warrior River, July 13, 1924, Small, Small & De Winkeler 11453 (NYB); dry pine land, Gainesville, July 1, 1935, West (MBG); borders of swampy lake 20 mi. north of Tampa, June 17, 1939, Woodson & Schery 115 (MBG).

6. B. LeContei Torr. & Gray, forma robustior Larisey, f. nov. 23

B. LeContei Torr. & Gray ex Chapman, Fl. South. U. S., ed. 1, 111, 1860, ed. 2, 1889, and ed. 3, 1897, in part.

B. LeContei var. β Torr. & Gray, Fl. N. Am. 1: 387. 1840.

As the species except: stem stout; leaflets obovate, 4-5 cm. long, 2.5-3 cm. broad; stipules 0.6-1.4 cm. long, 1-3 mm. broad; petioles 6 mm. long; racemes subtended by simple, stipulate leaves; bracts 2 cm. long, 1 cm. broad, bracteoles 1 cm. long, 0.3 cm. broad; standard 1.2 cm. high, wings and keel 1.4 cm. long.

Distribution: western Florida.

CITATION OF SPECIMENS:

FLORIDA: Marianna, coll. of 1838, ex Herb. Chapman (NYB, TYPE).

<sup>&</sup>lt;sup>28</sup>Ab specie differt ramis crassis; foliolis obovatis 4-5 cm. longis 2.5-3.0 cm. latis, stipulis 6-14 mm. longis 1-3 mm. latis, petiolis 6 mm. longis; racemis basi foliis simplicibus stipulatis subtendentibus; bracteis 2 cm. longis 1 cm. latis, bracteolis 1 cm. longis 0.3 cm. latis; vexillo 1.2 cm. alto, alis carinaque 1.4 cm. longis.

B. calycosa Canby in Bot. Gaz. 3: 65. 1878; Chapman, Fl. South. U. S., ed. 3, 122. 1897; Small, Fl. Southeast. U. S., ed. 1, 598. 1903, and ed. 2, 598. 1913; Small, Man. Southeast. Fl. 678. 1933.

Plant usually less than 1 m. high, blackening in drying, glaucous; stems slender, firm, glabrous, diffusely branched, branches usually straight, sometimes slightly geniculate; leaves short-petiolate, petioles 1-3 mm. long, leaflets spatulate. oblanceolate to narrowly cuneate, sparsely pubescent, 1-3 cm. long, 0.8-1 cm. broad; stipules elliptic or lanceolate, foliaceous, 1-2 cm. long, 3-5 mm. broad; racemes terminal, loose, usually straight, occasionally flexuous, rarely geniculate, 1-2 dm. long; pedicels slender, 3-4 cm. long, subtended by ovatelanceolate bracts 1.5-1.8 cm. long, 5-8 mm. broad, bibracteolate above the middle, bracteoles 1.5 cm. long, 5 mm. broad, bracts and bracteoles foliaceous, persistent; calyx-tube short, 2-3 mm. deep, all five lobes foliaceous, sparingly ciliate, upper two united about half their length, remaining three ovate, obovate, or occasionally lanceolate, four times the length of the tube, 1-1.2 cm. long, 5-6 mm. broad; corolla yellow, scarcely surpassing the calyx-lobes, standard suborbicular, 1 cm. high, 1 cm. broad, wings and keel 1.2 mm. long; overy glabrous, mature pod black, firm, reticulate, body broadly ovoid, 1 cm. long, barely exceeding the calyx, short-stipitate, short- and slender-beaked, beak slightly recurved.

Distribution: pine lands, eastern Florida.

CITATION OF SPECIMENS:

FLORIDA: near St. Augustine, Floyd (NYB); pine barrens, St. Augustine, Floyd (GH); sandy barrens, east Florida, 1878, Floyd ex Herb. Canby (MBG); dry pine barrens, July 1877, Reynolds (MBG,TYPE, USN,GH); pine barrens, east Florida, July 1878, Reynolds (NYB); dry pine-oak woods south of Green Cove Springs, July 14, 1935, West (MBG); dry pine-oak woods, Penny Farms, July 14, 1935, West (MBG).

8. B. hirsuta Small, Fl. Southeast. U. S., ed. 1, 598, 1331. 1903, and ed. 2, 598. 1913; Small, Man. Southeast. Fl. 676. 1933.

B. calycosa Canby var. villosa Canby in Bot. Gaz. 12: 39. 1887, not B. villosa (Walt.) Nutt.

Plant 0.3-1 m. high, hirsute throughout, with stiff, erect, ferruginous hairs, not blackening in drying, assuming reddishbrown cast; stems stout, diffusely branched, branches straight; leaves petiolate, petioles 3-8 mm. long, leaflets obovate, spatulate to narrowly cuneate, obtuse or apiculate, 1-3 cm. long, 0.8-1.2 cm. broad; stipules oblanceolate or oblong, elliptic, 1-1.5 cm. long, 3-5 mm. broad; flowers disposed in intercalary racemes, 7-20 cm. long, or occasionally in short terminal racemes; pedicels slender, 3-4 cm. long, subtended by foliaceous, ovate, elliptic bracts 1.5-2 cm. long, 5-9 mm. broad, bibracteolate above the middle, bracteoles lanceolate to narrowly elliptic, 1-1.2 cm. long, 2-3 mm. broad, bracts and bracteoles foliaceous, persistent; calyx-tube short, 2-4 mm. deep, lobes foliaceous, lanceolate, spatulate, rarely obovate, mucronate or apiculate, four times the length of the tube, 0.8-1.2 cm. long, 3-4 mm. broad, upper two united about half their length; corolla yellow, usually distinctly surpassing the calyx-lobes, standard suborbicular, slightly emarginate, 0.9-1.2 cm. high, 0.9-1.0 cm. broad, wings and keel 1-1.3 cm. long; ovary hirsute, mature pod brownish-black, pubescent, finely reticulate, body broadly ovoid, 1-1.3 cm. long, usually surpassing the calyxlobes, long-beaked.

Distribution: dry sandy pine lands, western Florida.

CITATION OF SPECIMENS:

FLORIDA: high pine land near Crestview, May 22, 1930, Blanton 6573 (MBG, USN,FM); dry pine woods, Walton Co., "De Funiak Springs, Wilson Co.," northwestern Fla., Curtiss 699 (MBG,TYPE, USN,NYB,FM,UM,UN); dry pine barrens, De Funiak Springs, June 21, 1897, Curtiss 5899 (MBG,USN,GM,NYB,FM,UM,UN,KA,UF); dry pine barrens, Crestview, May 11, 1898, Curtiss 6406 (MBG, USN,GH,NYB,UM,UN); pine barren, De Funiak Springs, May 8, 1892, Mohr (USN); flat woods, De Funiak, July 1896, Rolfs 676 (MBG,FM,UF); De Funiak, May 18, 1906, Tracy 9100 (MBG,USN,GH,FM,WU,UM,UN).

B. lanceolata (Walt.) Ell. Sketch Bot. S. Car. & Ga. 1: 467.
 1821; DC. Prodr. 2. 100. 1825; Torr. & Gray, Fl. N. Am. 1: 383.
 1840; Chapman, Fl. South. U. S., ed. 1, 111. 1860, ed. 2, 111.
 1889, and ed. 3, 121. 1897; Small, Fl. Southeast. U. S., ed. 1, 599.
 1903, and ed. 2, 599. 1913; Small, Man. Southeast. Fl. 676.
 1933.

B. uniflora (Michx.) Nutt. Gen. N. Am. Pl. 1: 281. 1818; Spreng. Syst. 2: 347. 1825.

Sophora lanceolata Walt. Fl. Car. 135. 1788.

Podalyria uniflora Michx. Fl. Bor. Am. 1: 263. 1803; Pursh, Fl. Am. Sept. 1: 307. 1814.

Lasinia reticulata Raf. New Fl. N. Am. 2: 48. 1836 [1837]. Plant less than 1 m. high, minutely appressed-pubescent throughout, pubescence whitish, pale yellow to tawny; stem slender, firm, lightly ribbed, widely branched, main stem remaining distinct and erect, branches slightly geniculate, ascending-spreading; leaves subsessile to short-petiolate, petioles 2-4 mm. long; leaflets occasionally subsessile, more frequently short-petiolulate, petiolules 2-5 mm. (rarely 1 cm.) long; blades firm, reticulate, yellow-green, somewhat glossy above, glaucous below, blackening, 5-8 cm. long, 1-1.5 cm. broad, usually lanceolate, oblanceolate, spatulate, occasionally narrowly elliptic, always tapering toward the base, rounded, retuse or mucronate at apex, rarely acuminate; stipules triangular, lanceolate, setaceous, always minute, caducous; flowers single in axils of upper leaves, or in few-flowered racemes terminating the branches; pedicels 4-7 mm. (rarely 1 cm.) long, stout; calyx-tube 6-9 mm. deep, upper lip cleft about 1 mm., lobes of the lower lip deltoid, 2-3 mm. deep; corolla yellow, standard notched, 1.5-7 cm. high, 1.2-4 cm. broad, wings and keel 2-2.2 cm. high; ovary densely white- or tawny-pubescent; mature pod usually glabrate, woody, dark brown or black, subglobose or ovoid, 0.9-1.3 cm. broad, 1.5-2.2 cm. long, stipe exceeding the calyx 1-2 mm., long- and slenderbeaked.

Distribution: dry sandy hills and pine barrens, Georgia, Florida, and Alabama.

CITATION OF SPECIMENS:

GEORGIA: Tebeauville, April 1869, Canby (MBG,GH,NYB,FM); dry ground, Jesup, July 11, 1901, Curties 6840 (MBG,USN,GH,NYB,UM,UN,KA); no definite locality, 1884, Harden (ANSP); dry pine barrens near Covena, Emanuel Co., April 5, 1904, Harper 2095 (MBG,USN,GH,NYB); Vidalia, April 1914, Huger (MBG); Wayne Co., June 1893, Kearney (OU); no definite locality, LeConte (ANSP); dry pine barrens 4 mi. west of Folkston, Charlton Co., April 12, 1936, Leeds 2559 (NYB,FM); sandy roadside 6½ mi. south of Irwinville, Irwin Co.,

Mar. 19, 1938, Pyron & McVaugh 2122 (MBG); weed of sandy roadside 1 mi. south of Pelham, Mitchell Co., Mar. 21, 1938, Pyron & McVaugh 2289 (MBG); dry sand hills 1 mi. south of Butler, Taylor Co., Mar. 22, 1938, Pyron & McVaugh 2270 (MBG); pine barrens, Jesup, April 1893, Buth (MBG,OU); common on drier upland sand ridges, usually in cut-over pine woods and pastures, Tift Co., May 15, 1935, Stephens (MBG).

FLORIDA: sandy woods 5 mi. north of Calhoun, Duval Co., Mar. 24, 1938, Buchanan Jr. (MBG); no definite locality, Chapman (USN); Apalachicola, July 1878, Chapman (FM); dry sandy pine land, De Land, Harkness (MBG); McClenny, Feb. 1887, Heading (UM); road to Lanark, 3 mi. west of Ochlockonee River, Franklin Co., May 29, 1935, Kurs (MBG); McClenny, Baker Co., April 4, 1898, Lighthipe 565 (MBG,UM,UW); common, dry sandy pine woods, Green Cove Springs, Mar. and April, Mohr (USN); dry sandy pine land, McIntyre Co., May 4, 1930, Moldenke 1130 (MBG,USN,NYB,DU); dry pine barrens, St. Augustine, Mar. 1878, Reynolds (MBG,USN,NYB,FM,OU); dry pine barrens, St. Augustine, early summer, 1880, Reynolds (MBG,NYB); dry pine barrens at head of Pellicier's Creek, St. Johns Co., Mar. 2, 1882, Smith 447 (USN,FM); along roadside between Tamaco River Bridge and Ormond, Mar. 26, 1937, Springer (UF); Port Orange, Mar. 26, 1895, Stranb 79 (GH); dry pine-oak woods south of Green Cove Springs, July 14, 1935, West (MBG); dry pine-oak woods, Penny Farms, July 14, 1935, West (MBG). Alabama: dry pine ridges, eastern shore, Mobile Bay, May 1880, Mohr (FM).

10. B. elliptica Small, Fl. Southeast. U. S., ed. 1, 599, 1331. 1903, and ed. 2, 599. 1913; Small, Man. Southeast. Fl. 676. 1933.

B. lanceolata (Walt.) Ell. var. β Torr. & Gray, Fl. N. Am. 1: 384. 1840.

B. lanceolata (Walt.) Ell. ex Chapman, Fl. South. U. S., ed. 1, 111. 1860, ed. 2, 111. 1889, and ed. 3, 121. 1897, in part.

Plant usually less than 1 m. high, minutely tawny appressed-pubescent throughout; stem firm, ribbed, widely subdichotomously branched, branches strongly geniculate forming 135-degree angles; leaves usually sessile to short-petiolate, but petioles of the lower leaves sometimes 0.7–1 cm. long; leaflets petiolate, petioles 0.4–1 cm. long; blades firm, reticulate, glossy and blackening above, remaining dull and deep green below, 2–4 cm. broad, 8–13 cm. long, regularly narrowly to broadly elliptic, always tapering toward each end, more pronouncedly toward the base, but abruptly rounded, retuse or slightly mucronate, rarely acuminate at the apex, widest part usually just above the middle; lower leaflets occasionally lanceolate, upper ones rarely obovate-cuneate; stipules rarely lanceolate, 6 mm. long, subpersistent, usually setaceous, minute, caducous; flowers single in axils of upper leaves or in few-flowered

racemes terminating the branches; floral bracts narrowly fanceolate to setaceous, caducous; pedicels 2-7 mm. (rarely 7 mm.) long, stout; calyx-tube conspicuously nerved, 0.7-1 cm. deep, upper lip cleft 1 mm. but not usually separating, lobes of lower lip deltoid, 3 mm. deep, 3-4 mm. wide at mouth of tube. notch frequently broadly curved rather than angled; corolla yellow, standard deeply notched, 1.8 cm. high, 1.7 cm. broad. wings and keel 2.5 cm. high, 1 cm. broad; ovary densely tawnypubescent; mature pod glabrate or with remains of tawny pubescence, brownish-black, woody, ovoid to oblong, body 2 cm. long, 1-1.3 cm. broad, short-stipitate, stipe not exceeding the firm, persistent calyx, long-beaked.

Distribution: dry sandy pine lands, Florida and adjacent Georgia, and Alabama.

CITATION OF SPECIMENS:

GEORGIA: no definite locality, Boykin (ANSP).

FLORIDA: no definite locality, Chapman (GH,FM); middle Florida, Chapman 190 (NYB); Apalachicola, Chapman (MBG); no definite locality, "Chapman mis. 1846" (MBG); Aspalaga, April 1898, Chapman (MBG); Quincy, Chapman (USN, ANSP); dry sandy soil near Apalachicola, April, Curtiss 689 (NYB, TYPE, MBG, USN,GH,ANSP,FM,UM); swamps, Walton Co., summer 1885, Curtiss (NYB); Apalachicola, 1892, DeVasey (USN); dry pine barrens, 5 mi. south of Tallahassee, Leon Co., April 1, 1933, Griscom 18393 (GH); southwest Leon Co., July 21, 1924, Handley A-147 (USN); 20 mi. above mouth of Apalachicola River, May 5, 1926, Howell 1165 (USN); dry pine land, Gretna, April 18, 1930, Kincaid & West (MBG); "in pinetis, inter Tallahassee et Quincy, Mai 1843," Rugel (MBG, NYB); dry pine barrens, Apalachicola, Saurman (ANSP).

ALABAMA: in high pine land, Atmore, April 17, 1935, Blanton 263 (GH,NYB,

FM); dry sandy pine woods, Baldwin Co., May 1879, Mohr (USN).

11. B. elliptica Small var. tomentosa Larisey, var. nov.24

As the species except: more pubescent throughout, but especially on the lower leaf surfaces, forming a dense, tawny, felt-like mat; leaflets more nearly acuminate, smaller, 7-9 cm. long, 2-3.5 cm. broad; flowers smaller, calyx 7-8 mm. deep, standard 1.3-5 cm. high, wings and keel 1.8-2 cm. high, rarely slightly larger.

<sup>\*</sup>Ab specie differt omnino pubescentiore; foliis infra dense fulvo-tomentosis; foliolis fere acuminatis 7-9 cm. longis, 2.0-3.5 cm. latis; floribus minoribus, calyce 7-8 mm. alto, vexillo 1.3-5.0 cm. alto, alis carinsque 1.8-2.0 cm. longis raro maiori-

Distribution: dry sandy pine lands, Florida and adjacent Alabama.

CITATION OF SPECIMENS:

FLORIDA: dry soil near Pensacola, April 13, 1899, Biltmore Herb. 1595f (MBG, NYB); dry pine land, Okalousa, April 3, 1929, Blackman & Enlow (MBG); open pine woods near DeFuniak Springs, April 27, 1898, Curtiss 6379 (MBG,TYPE, USN, GH,NYB,UM,UN); Lake City, Roifs 85 (MBG,FM); De Funiak, July 1896, Roifs 671 (MBG).

ALABAMA: pinelands, Loxley, June 22, 1933, Bombard & Haas (TU); Baldwin Co., May 1893, Mohr (MBG).

12. B. Nuttalliana Small, Fl. Southeast. U. S., ed. 1, 599. 1903, and ed. 2, 599. 1913; Cocks, The Leguminosae of Louisiana. La. State Mus. Nat. Hist. Surv. Bull. 1: 5, pl. 6. 1910.

B. uniflora Hook. Comp. Bot. Mag. 1: 21. 1835, not B. uniflora (Michx.) Nutt.

B. lanceolata (Walt.) Ell. var. Y Torr. & Gray, Fl. N. Am. 1: 384. 1840. (var. uniflora of authors).

B. lanceolata var. uniflora Torr. & Gray ex Canby in Bot. Gaz. 4: 131. 1879.

B. lanceolata var. texana Holz. in Contr. U. S. Nat. Herb. 1: 286, 1893.

B. texana (Holz.) Pollard & Ball in Proc. Biol. Soc. Wash. 13: 133. April 1900, not B. texana Buckl.

B. confusa Pollard & Ball in Proc. Biol. Soc. Wash. 13: 158. June 1900, not B. confusa Sweet.

B. nuculifera Greene, Leaflets Bot. Obs. 2: 84. 1910.

Plant 4-11 dm. high, more or less densely pubescent throughout, occasionally glabrate in age, slightly blackening; stem slender, firm, much-branched, branches usually geniculate, ascending; leaves sessile to subsessile, petioles not usually exceeding 1 mm. in length; leaflets firm, reticulate, glossy above, dull below, oblong to obovate, cuneate at base, obtuse to rounded at apex, frequently emarginate, occasionally apiculate, 2.5-3.5 cm. long, 1.3-2 cm. broad, lateral leaflets converging; stipules deltoid, deltoid-lanceolate to setaceous, inconspicuous, usually caducous; flowers solitary in upper axils, or forming short terminal racemes; floral bracts narrowly lanceolate to setaceous, 2-4 mm. long, caducous; pedicels 2-5 mm. long; calyxtube 7-9 mm. long, hirsute, deeply blackening, upper lip en-

tire, barely cleft or distinctly emarginate, lobes of the lower lip deltoid or deltoid-lanceolate, apiculate, 3–4 mm. deep; corolla yellow, standard 0.8–1.5 cm. long, 0.6–1.2 cm. broad, wings and keel 1.7–2 cm. long; ovary thickly pubescent, mature pod somewhat glabrate, though usually more or less villous, blackish, coriaceous to ligneous, thick, subglobose to ovoid, 0.4–1.3 cm. long, 0.2–1.1 cm. thick, stipe not exceeding the calyx-lobes, beak short, recurved.

Distribution: Mississippi to Arkansas and Oklahoma, southwest to Texas; reported from adjacent Mexico.

CITATION OF SPECIMENS:

MISSISSIPPI: Madison, April 28, 1925, Cook (USN); Ridgeway, April 18, 1927,

Woodson & Anderson 1538 (MBG).

LOUISIANA: in pine hills in vicinity of Alexandria, June 3, 1899, Ball 546 (USN, TYPE of B. confuse Pollard & Ball, MBG, NYB, GH, FN, UN); prairie along R.R. 3 mi. west of Lawtell, St. Landry Parish, April 26, 1936, Brown 6253 (LU); along R.R. north of Roark, Acadia Parish, April 26, 1936, Brown 6267 (LU); rare, pineoak-hickory woods southeast of Columbia, Caldwell Parish, June 24, 1936, Brown 6489 (LU); common in pine-hardwood woods southeast of Jena, Catahoula Parish, June 26, 1936, Brown 6533 (LU); open pastures, Shreveport, April 13, 1910, Cocks 1630 (TU); open fields, Shreveport, April 15, 1910, Cooks (MBG); Nachitoches, April 2, 1911, Cocks (TU); Shreveport, July 1909, "Dickson & Cocks 1791" (MBG); Calcasieu Parish, Featherman (LU); no definite locality, Hale (GH); in prairies, Opelousas, April 1880, Langlois (NYB,FM); in plains, Calcasieu Co., April 26, 1884, Langlois 8 (NYB); in plains, Chataignier, St. Landry Co., May 12, 1885, Langlois 7 (NYB); in prairie, Tokataite, Opelousas, May 20, 1885, Langlois 29 (USN); Chataignier, June 21, 1885, Langlois (NYB); dry open woods, Natchitoches, May 10, 1915, Palmer 7570 (MBG); low prairies, Jennings, Jefferson Davis Parish, May 15, 1915, Palmer 7631 (USN); dry sandy highland, cut-over pine land, Pineville, Rapides Parish, April 3, 1935, Smith 93 (LU); Shreveport, Aug. 4-6, 1897, Tracy 3450 (MBG,USN).

ARKANSAS: common in pine woods, Fulton, May 12, 1900, Bush 214 (MBG, USN,GH); common on prairie, Prescott, May 14, 1900, Bush 264 (USN); prairies, Fulton, April 29, 1909, Bush (MBG); dry sand hills north of Texarkana, Miller Co., June 9, 1898, Eggert (MBG); open woods near Fort Smith, June 1835, Engelmann 1002 (MBG); Camden, May 10, 1850, Fendler (MBG,GH); Malvern, May 1884, Letterman (MBG); Prescott, Letterman (MBG); no definite locality, Nuttall (NYB,ANSP); rocky ground along small stream near Mansfield, Sebastian Co., May 24, 1931, Palmer 39303 (MBG,GH); dry woods on high bluff on Ouachita River about 1 mi. above Arkadelphia, Clark Co., May 18, 1912, Wheeler (MBG,FM); dry woods near Arkadelphia, Clark Co., May 1913, Wheeler (MBG,FM).

OKLAHOMA: open place, mountain aide near Page, Le Flore Co., June 20, 1914, Blakley 1428 (MBG,GH,UM); Pine Valley, Le Flore Co., May 4, 1935, Goodman 2359 (MBG); common, open woods, Shawneetown, McCurtain Co., May 26, 1916, Houghton 3800 (MBG).

TEXAS: Hughes Springs, Cass Co., May 9, 1903, Biltmore Herb. 14783a (MBG, USN,UM); common on prairie, Sulphur, May 11, 1900, Bush 207 (USN); 6 mi. southwest of Oakwood, Leon Co., May 11, 1937, Cory \$1741 (MBG); 9 mi. northwest of Jefferson, Marion Co., May 19, 1937, Cory 22836 (MBG); open woods, old fields, etc., San Augustine, Crocket (USN); Huntsville, June 3-12, 1908, Dixon 64 (FM); Walker Co., May 6-12, 1910, Dixon 525 (USN,FM); vicinity of Houston, Harris Co., May 22-June 12, 1910, Dixon 607a (FM); Troupe, Smith Co., April 19, 1899, Eggeri (MBG); Spring, May 4, 1924, Fisher (DU); Shiro, Mar. 12, 1934, Fisher 34104 (FM); Houston, 1914 Hayden (GH); Mansfield, Tarrant Co., May 1927, Killian (UT); Dalby, May 4, 1896, Milligan (USN); no definite locality, coll. of 1889, Neally 71 (USN); no definite locality, coll. of 1889, Neally 73 (USN, TYPE of B. lanceolata var. texana Holz.); sandy knolls, prairies, Columbia, Brazoria Co., April 12, 1914, Palmer 5213 (MBG, USN); Arlington, May 1880, Reverchon (MBG); sandy woods, Dallas Co., June 1881, Reverehon 11 (GH); sandy woods, Dallas, June 1882, Reverchon 184 (MBG); common in sand, Big Sandy, May 27-28, 1901, Reverchon 2652 & 2654 (MBG); sandy soils, Beaumont Co., April 25, 1903, Reverehon 3739 (MBG); woods in Angelina Bottom, Angelina Co., May 7, 1903, Reverchon 3740 (MBG); sandy woods 5 mi. from Polytechnic, Tarrant Co., April 22, 1921, Ruth 62 (FM,UW,KA); in sandy woods near Polytechnic, Tarrant Co., April 27, 1925, Ruth 621 (USN); Palestine, April 14, 1929, Tharp 5420 (USN, UT); Montgomery Co., April 19, 1930, Tharp (UT); Henderson Co., June 6, 1932, Tharp (UT); Walker Co., July 9, 1920, Warner 12 (USN, UT); Nacogdoches, June 15, 1931, Whitehouse (UT); abundant, dry, open ground near Gallatin, Cherokee Co., April 10, 1916, Young (GH,UT).

## 13. B. intercalata Larisey, sp. nov.25

Plant less than 1 m. high, finely pubescent throughout, often glabrate in parts; stem somewhat stout, firm, ribbed, slightly

<sup>\*\*</sup>Herba vix 1 m. alta omnino molliter pubescens saepe plus minusve glabrata; caules crassiusculi firmi striati paulo geniculati late ramosi, ramis erectis raro paululo geniculatis sat elongatis virgatis glabratis. Folia inferiora brevi-petiolata, superiora subsessilia, foliolis obovatis vel ellipticis apice obtusis rotundatisve saepe emarginatis basi cuneatis 4-6 cm. longis 1.7-2.2 cm. latis firme membranaceis reticulate venosis supra saturate viridibus illustribus paulo nigrescentibus subtus opacis sat glaucis saepe glabratis marginibus nervo medio basi excepto, stipulis deltoideis aut deltoideo- aut ovato-lanceolatis 3-8 mm, longis persistentibus. Racemi interealati 1.5-2.0 dm. longi, bracteis lanceolatis vel ovato-lanceolatis 0.8-1.2 cm. longis, 2-3 mm. latis persistentibus, pedicellis 0.9-1.3 cm. longis. Corolla lutea, vexillo 1.6 cm. longo et lato, alis et carina patulis inaequilateralibus auriculatis 2.0-2.2 cm. longis 7-8 mm. latis. Calycis tubum 7-9 mm. longum conspicue nervatum nigrescens extus sparse intus dense luteo-pubescens, labro superiore integro 4-5 mm. longo basi 5-6 mm. lato apice obtuse apiculato vel truncato usque ad 1 mm. lato, labri inferiori lobis deltoideis vel deltoideo-lanceolatis 3-4 mm. longis basi 2.5-3.0 cm. latis. Legumen subglobosum inaequilaterale longe stipitatum in rostrum paulo recurvatum gradatim contractum 1.5-7.0 cm. longum, 1.6-1.9 cm. latum tenue sed solidam juventate conspicue inflatum maturitate in rugas profundas corruens nigrescens valde reticulatum pubescens.

geniculate, widely branched, branches erect, only rarely lightly geniculate, elongate, virgate, glabrate; leaves subsessile above. lowermost petiolate, petioles 1-4 mm. long; leaflets firm, reticulate, glossy, dark green, slightly blackening above, dull, grayish below, usually glabrate except along the margins and midvein toward the base, obovate to elliptic, cuneate, apex obtuse to rounded, frequently emarginate, 4-6 cm. long, 1.7-2.2 cm. broad; stipules deltoid, deltoid-lanceolate, ovate-lanceolate, 3-8 mm. long, persistent; flowers borne in intercalary racemes 1.5-2 dm. long; floral bracts lanceolate to ovate-lanceolate, 8-12 mm. long, 2-3 mm. broad, persistent; pedicels 0.9-1.3 cm. long; corolla yellow, standard 1.6 cm, high, 1.6 cm, broad, wings and keel strongly curved, inequilateral, auriculate, 2-2.2 cm. high, 7-8 mm. broad; calvx-tube conspicuously nerved, blackening, finely pubescent without, densely tawny-pubescent within, 7-9 mm. long, upper lip entire, obtusely apiculate or truncate, blunt tip up to 1 mm. across, base 5-6 mm. across, 4-5 mm. deep, lobes of lower lip deltoid to deltoid-lanceolate, 3-4 mm. deep, base 2.5-3 mm. across; pod thin but firm, much inflated but collapsing at maturity into deep folds, black, strongly reticulate, pubescent, 1.5-7 cm. long, 1.6-1.9 cm. broad, subglobose, inequilateral, long-stipitate, long-beaked, beak slightly recurved.

Except for the unique manner in which the flowers are borne, this species bears a close superficial resemblance to B. Nuttalliana Small. It may possibly be a hybrid between the latter and B. leucophaea Nutt., but at present there is no concrete evidence for this assumption.

Distribution: prairies, western Louisiana.

CITATION OF SPECIMENS:

LOUISIANA: in prairies, Caleasieu, April 26, 1884, Langlois (NYB,TYPE); in plains, Caleasieu Co., April 26, 1884, Langlois (NYB); plains, Chataignier, St. Landry Co., May 19, 1885, Langlois (NYB).

B. bracteata Muhl. ex Ell. Sketch Bot. S. Car. & Ga. 1:
 1821; DC. Prodr. 2: 100. 1825; Small, Fl. Southeast.
 U. S., ed. 1, 600. 1903, and ed. 2, 600. 1913; Small, Man. Southeast. Fl. 677. 1933.

B. leucophaea Nutt. ex Chapman, Fl. South. U. S., ed. 1, 112. 1860, ed. 2, 112. 1889, and ed. 3, 122. 1897, in part.

B. saligna Greene, Leaflets Bot. Obs. 2: 84. 1910.

Podalyria bracteata Muhl. Cat. Pl. Am. Sept. 42. 1815, nomen subnudum.

Lasinia bracteata Raf. New Fl. N. Am. 2: 50. 1836 [1837].

Plant 3-6 dm. high, more or less softly and loosely pubescent throughout, darkening but not blackening in drying; stem stout, ribbed, subdichotomously branched, branches divaricate; leaves petiolate, petioles 0.3-1.2 cm. long, leaflets firm, oblanceolate to obovate or elliptic-obovate, cuneate, apex acute or obtuse, 5-10 cm. long, 2-3.5 cm. broad, lower surface finely reticulate at maturity; stipules wide-subulate, acuminate, 2-4 cm. long, persistent; racemes axillary, 1-2 dm. long, secund, declined; floral bracts lanceolate to ovate-lanceolate, 1-3 cm. long, persistent; pedicels 1-1.5 cm. long; calyx-tube 1 cm. deep, upper lip emarginate or distinctly 2-lobed, lobes of the lower lip deltoid-ovate, 4-5 mm. long; corolla cream or yellow, standard 1.8-2 cm. high, 1.5-1.7 cm. broad, wings and keel 2.2-2.5 cm. long; pods ligneous, body elliptic, 3-4 cm. long, 1.5-1.7 cm. broad, sparsely subappressed-pubescent, slightly reticulate, gradually tapering into a slender beak, stipe equalling the calyx in length.

Distribution: dry sandy woods, North Carolina, south to Georgia and Alabama.

CITATION OF SPECIMENS:

NORTH CAROLINA: no definite locality, Curtis (NYB); vicinity of Wilmington,

April 14-17, 1911, Bartram & Long (ANSP).

SOUTH CAROLINA: Columbia, May 9, 1899, Canby & Sargent 20 (GH); dry sandy soil, Anderson, Aug. 4, 1919, Davis 9142 (MBG); Morehead's woods near Anderson, May 4, 1920, Davis 1315a (MBG,USN); dry open woods, Anderson, May 4, 1920, Davis 1315b (UT); Watson's woods, Anderson, Anderson Co., May 4, 1920, Davis 1315c (MBG,UM,UT); Columbia, April 14, 1867, Doggett (UW); Anderson, Gibbes (NYB); dry woods near Seneca River, Clemson College, Oconec Co., April 18, 1906, House 1862 (MBG); vicinity of Batesburg, Lexington Co., April 29, 1911, McGregor 25 (USN); sandy open woods near Irno, Lexington Co., April 19, 1932, Palmer 39958 (MBG,GH); Aiken, 1880, Ravenel (USN); Aiken, April 7, 1888, Smith (ANSP); woods, Columbia, June 1891, Taylor (UM); dry open woods in clayey soil northwest of Saluda, April 27, 1932, Weatherby 6140 (NYB,USN,GH).

GEORGIA: Wrightsboro, Chapman (NYB); in open oak woods, Augusta, April 24, 1900, Cuthbert 179 (NYB); dry open woods, Augusta, April 29, 1902, Cuthbert (UF); dry woods, Athens, April 1897, Harper (NYB); Winterville, April 22, 1925, Maguire E3379 (UG); Oconee Heights, Clarke Co., April 25, 1923, Miller E3383 (UG); Madison Springs, Ravenet (GH); Athens, April 15, 1910, Rice & Rast E3391 (UG); in oak woods, head of Cloverhurst, Athens, April 25, 1928, Reade E3381 (UG); oak woods, Experiment, April 25, 1899, Riegel (KA); 'in montibus supra Casseville, Ga. sup., April 1845,'' Rugel 190 (NYB); Tallapoosa, April & May, 1900, Way 31 (USN,TYPE of B. saligna Greene); Royston, May 3, 1928, Wherry (NYB).

ALABAMA: dry cherty woods on south slope of Craig Mtn., Cherokee Co., June 22, 1936, Harper 3528 (MBG,USN,NYB,GH); Talladega Mtns., June 26, 1911, Howell

779 (USN).

15. B. leucophaea Nutt. Gen. N. Am. Pl. 1: 282. 1818; DC. Prodr. 2: 100. 1825, in part; Torr. & Gray, Fl. N. Am. 1: 385. 1840, in part; Chapman, Fl. South. U. S. ed. 1, 112. 1860, ed. 2, 112. 1889, and ed. 3, 122. 1897, in part; Curt. Bot. Mag. III, 27: pl. 5900. 1871; Small, Fl. Southeast. U. S., ed. 1, 601. 1903, and ed. 2, 601. 1913; Rydb. Fl. Prairies & Plains Central N. Am. 455. 1932.

B. bracteata (Muhl.) Ell. ex Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 266, fig. 2052. 1897, and ed. 2, 2: 345, fig. 2456. 1913; Gray, New Man. Bot. ed. 7, 506. 1908.

Lasinia bracteata Raf. New Fl. N. Am. 2: 50. 1836 [1837].

Plant 3-8 dm. high, tawny-villous to woolly-tomentose throughout; stems stout, heavily ribbed, simply branched, branches divaricate; leaves subsessile to short-petiolate, petioles not usually more than 3 mm. long; leaflets oblanceolate, spatulate, or narrowly elliptic, apex acute, slightly apiculate, rarely retuse, 3-10 cm. long, 1-2 cm. broad, leathery, strongly reticulate, lateral leaflets more or less decurrent on the petioles; stipules ovate- to cordate-lanceolate, acuminate, foliaceous, 2-4 cm. long, persistent; racemes axillary, 1-2 dm. long, secund, declined; floral bracts ovate- to cordate-lanceolate, acuminate, 1-3 cm. long, persistent; pedicels slender, 1-4 cm. long; calyx-tube 1 cm. deep, strigillose, upper lip slightly emarginate to distinctly two-lobed, lobes of the lower lip deltoid-lanceolate, 3-4 mm. long; corolla white, cream, or yellow, standard 2.2 cm. high, 2 cm. broad, wings and keel 2.4-2.7 cm. long; mature pod ovoid-elliptic, 4-5 cm. long, 1.5-2.5 cm.

broad, firm, strongly reticulate, densely spreading-pubescent, short-stipitate, stipe not exceeding the calyx, body tapering gradually into a short and slender beak.

Hybridizes with B. viridis in Louisiana, Arkansas, and Oklahoma; with B. sphaerocarpa in Arkansas and Oklahoma; and

with B. minor in Missouri, Kansas, and Oklahoma.

Distribution: open woods and prairies, Michigan and Indiana to Minnesota, southwest to Arkansas and Texas. Introduced along railroads in Massachusetts.

CITATION OF SPECIMENS:

MASSACHUSETTS: by RR. between Woods Hole and Falmouth, July 1922, Taylor (ANSP).

MICHIGAN: prairie, Kalamazoo Co., Aug. 1, 1838, Wright (NYB).

INDIANA: RR., Benton Co., May 20, 1929, Barce, Barce & Welch 6126 (IU); open black- and pin-oak woods 0.5 mi. west of Crisman, Porter Co., July 10, 1920, Deam 31,562 (GH,IU); dry roadside about 4 mi. southwest of Crown Point, Lake Co., July 12, 1920, Deam 31,625 (CD); open flat black oak woods about 4 mi. southwest of Lake Village, Newton Co., July 13, 1920, Deam 31,633 (CD); frequent along RR. right-of-way 1 mi. south of Wanatah, LaPorte Co., Deam 36,708 (CD); roadside knoll 3.5 mi. southwest of Lowell, Lake Co., June 5, 1924, Deam 40,522 (CD); right-of-way of Monon RR., 4 mi. south of Medarysville, Pulaski Co., June 7, 1924, Deam 40,570 (IU); common in sandy soil on RR. right-of-way about 3 mi. west of Monticello, White Co., May 22, 1932, Deam 51,926 (IU); frequent, wooded promontory on high bank of the Wabash River at Black Rock, about 3.25 mi. southeast of Greenhill, Warren Co., May 29, 1933, Deam 53,840 (IU); rare, Jasper Co., June 12, 1924, Welch 5858 (IU).

KENTUCKY: open woods and prairies near Paducah, McCracken Co., June 17, 1920, Palmer 17928 (MBG); dry bank between Murray and Pine Bluff Ferry, Calla-

way Co., July 23, 1937, Smith & Hodgdon 4197 (USN, NYB).

WISCONSIN: St. Croix Falls, Aug. 20, 1900, Baker (GH); low ground, Arena, Iowa Co., June 15, 1929, Breakey (UW); no definite locality, ex Herb. Chapman (NYB); hillside, 1 mi. south of Milton, Rock Co., May 30, 1930, Fernhols & Wadmond (UW); Madison, May 23, 1891, Cheney (UW); Blue Mounds, May 30, 1894, Cheney (UW); Friendship, Adams Co., July 21, 1927, Davis (UW); prairie hillside, Battle Mtn., De Soto, Vernon Co., July 23, 1934, Fassett 17792 (UW); open sand and pine barrens north of Angelo, Monroe Co., July 25, 1934, Fassett 16468 (UW); prairie summit of Bogus Bluff, Gotham, Richland Co., Aug. 11, 1934, Fassett 16641 (UW); sand bank near Rising Sun, 7 mi. north of Mt. Sterling, Crawford Co., Aug. 12, 1934, Fassett 17790 (UW); RR., Bangor, La Crosse Co., Sept. 10, 1934, Fassett 17791 (UW); gravel hill, Sheridan, Waupaca Co., Sept. 15, 1934, Fassett 16541 (UW); sandy roadside near Lemonweir, 3 mi. southeast of Mauston, Juneau Co., Sept. 17, 1934, Fassett 16540 (UW); prairie relic, 3 mi. south of Livingston, Grant Co., Sept. 23, 1934, Fassett 17793 (UW); sandstone ledge near Highway K, 3 mi. south of Mt. Ida, Grant Co., Sept. 17, 1935, Fassett 17794 (UW); in sand, Camp Douglas, Juneau Co., Oct. 7, 1934, Fassett & Bushnell 16565 (UW); prairie relic, roadside, County Trunk Highway B, east of Tunnel City, Monroe Co., Oct. 7, 1934, Fassett & Bushnell 16729 (UW); dry soil, Necedah Mound, Necedah Juneau Co., May 22, 1932, Fassett & Drescher 14217 (UW); sand dunes, Waumandee Terrace, Fountain City, Buffalo Co., Aug. 25, 1927, Fassett & Wilson 4365 (UW); river bank, Janesville, Rock Co., May 24, 1931, Hagen (UW); Madison, coll. of 1861, Hale (MBG,UW); prairie, June 16, 1883, Hasse (NYB); Boscobel, June 1884, Hasse (NYB); thinly oak-covered, morainic "island" west of University Creek bridge, University Bay, Madison, May 30, 1908, Heddle 1095 (UW); RR., northwest of Black Earth, Dane Co., Aug. 3, 1916, Heddle 2504 (UW); rich wooded hillside 1.5 mi. southeast of Ithaca, Richland Co., June 10, 1912, Lansing 3448 (38455) (UW); Milwaukee, Lapham (ANSP, UW); Beloit, June 1886, Maxwell (UW); sandy hillside, Leyden, Rock Co., May 30, 1928, Mead (UW); Kilbourn City, Columbia Co., June 10, 1901, Meredith (ANSP); Pine Bluff, Dane Co., May 28, 1929, Oelmiller (UW); La Crosse Co., July 16, 1887, Pammel (MBG); sandy soil, top of hill between Eau Claire and Chippewa Falls, July 9, 1915, Rosendahl & Butters 3155 (UM); Poynette, June 6, 1890, Russell (UW); no definite locality, ex Herb. Torrey (NYB); Fairchild, Eau Claire Co., May 23, 1894, Weinsirl

ILLNOIS: Aurora, June 1881, Bassett (ANSP); prairies about Salem, May 1880, Bebb (ANSP); prairies north of Woodlawn, Jefferson Co., May 16, 1898, Eggert (MBG); dry soil along RR., Chillicothe, May 15, 1880, Fisher (KA); black oak association, Shirland, June 26, 1908, Gleason (GH); sand dunes, Bath, Aug. 14, 1913, Gleason (GH); prairies, Menard Co., 1861, Hall (USN); Troy Grove, June 3, 1893, Hapeman (UW); roadsides, Port Byron, June 22, 1892, Harper (UW); rare, dry prairies, Peoria, May 1894, McDonald (GH, NM); Augusta, April 1843 (1844-?), Mead (MBG,NYB,GH,ANSP); Romeo, May 9, 1896, Merner 14864 (UW); rare, field south of Elmhurst, July, Moffatt 148 (UM); uncommon, prairies near Chicago, Aug. 3, 1892, Moffatt 646 (UW); sandy barrens near Oquawka, May 1875, Patterson (MBG,ND,UW); near Naperville, May 27, 1898, Powell 17572 (UW); prairie, Kinkade's, Richland Co., Sept. 13, 1919, Ridgway 909 (GH); prairies, Will Co., May 9, 1896, Umbach (MBG,ANSP,UM); prairies, Romeo, May 22 & July 26, 1897, Umbach (MBG,GH,UM); prairies, Lisle, May 19, 1900, Umbach 11964 (UW).

MINNESOTA: St. Cloud, Campbell (ANSP); dry dunes, sand prairie, Weaver, Wabasha Co., Aug. 28, 1926, Fassett & Hotchkiss 3436 (UM); dry soil, Winona Co., July 1886, Holsinger (UM); bluff slopes, Winona Co., June 1901, Holsinger (UM); Lake City, Sept. 1884, Manning (GH, UM); Spring Grove, June 3, 1902, Rosendahl 289 (UM); Winnebago Valley, Houston Co., May 1901, Wheeler 1034 (UM).

Iowa: prairie, Decatur Co., May 25, 1904, Anderson (MBG); Page Co., May 11, 1891, Barkley (MBG); dry prairies, Wesley, May 24, 1898, Breithaupt 9286 (UW); low prairie, Black Hawk Co., June 6, 1929, Burk 301 (MBG); along road to Moorland near Fort Dodge, Webster Co., May 29, 1904, Churchill 2051 (UN); near Angus, Boone Co., May 19, 1904, Churchill 2052a (UN); near Carbon, Adams Co., May 23, 1905, Churchill 2052b (UN); dry prairie, Armstrong, Emmet Co., May 19, 1887, Cratty (MBG,USN); Vinton, Davis (UW); prairie, Fayette, May 14, 1894, Fink (GH, UM); Johnson Co., May 13, 1895, Fitzpatrick & Fitzpatrick (MBG); roadside west of Stockport, Van Buren Co., June 1924, Graves 2114 (MBG); along RR., Cone City, Muscatine Co., May 1926, Graves (MBG); Elmyra,

Hitchcock (MBG); Iowa City, June 22, 1889, Hitchcock (KA); Grinnell, May 21, 1877, Jones (ANSP); thickets and open ground above limestone bluffs of Mississippi River near Keckuk, Lee Co., May 20, 1929, Palmer 35866 (OH); New Albin, July 22, 1897, Pammel 590 (MBG, USN, GH); Ames, May 1903, Pammel (GH); Emmet Co., July 1926, Pammel & Fisk (MBG); Davenport, coll. of 1848, Parry (NYB); Fort Dodge, May 29, 1909, Somes 3095 (USN).

MISSOURI: Sedalia, April 30, 1925, Archias 3 (MBG); on prairie, Jackson Co., May 8, 1864, ex Herb. Broadhead (MBG); common, Montier, May 15, 1894, Bush 78 (MBG,ND); introduced, uncommon, Courtney, Jackson Co., May 25, 1896, Bush 304 (MBG); prairies, Pettis Co., May 7, 1935, Bush 14763 (MBG); rocky woods, Eagle Rock, May 9, 1936, Bush 15386 (MBG); hillsides, Grundy Co., May 10, 1936, Bush 7 (MBG); hillsides, Grundy Co., May 10, 1936 Cruikshanks 7 (MBG); dry prairies, La Grange Co., May 9, 1912, Davis 1323 (MBG); dry open woods, McCune Station, Pike Co., May 20, 1919, Davis 4401 (MBG,UM); Carson, Howell Co., June 27, 1878, Eggert (MBG); Kirkwood, St. Louis Co., May 12, 1879. Eggert (MBG); "in Waldern," St. Louis Co., May 16, 1879, Eggert (MBG); open pieces, St. Louis Co., May 16, 1879, Eggert (GH); Missouri RR., north of Webster, St. Louis Co., May 16, 1879, Eggert (MBG); South Webster, St. Louis Co., June 21, 1887, Eggert (MBG); St. Louis, May 1843, Engelmann (MBG); siliceous hills of Washington Co., Nov. 1845, Engelmann (MBG); Allenton, May 23, 1892, ex Herb. Glatfelter (MBG); south slope, Shepard Mtn., Arcadia, Iron Co., May 26, 1918, Greenman 3888 (MBG); Windsor Springs, June 13, 1891, Hitchcock (MBG); St. Louis, May, James in Long's Expedition (NYB); Allenton, July 17, 1884, Kellogg (MBG); open woods near RR., east of Mansfield, Ozark Mtns., June 5-12, 1911, Lansing 3196 (USN,GH); Allenton, Letterman (MBG); Allenton, St. Louis Co., Aug. 13, 1933, Lodewyks 41 (MBG); common on prairie, Waldo Park, Jackson Co., May 2, 1897, Mackensie (UM); common, prairies, Hickman's Mills, Jackson Co., May 14, 1899, Mackensie 13184 (UW); St. Louis, Nuttall (ANSP, TYPE); along RR. between Greentop and Sublette, Adair Co., May 16, 1938, Ownbey & Ownbey (MBG); common on prairie, Webb City, Jasper Co., May 7, 1902, Palmer 128 (MBG); open ground near river, Monticello, Lewis Co., June 26, 1933, Palmer & Steyermark 40679 (MBG); wet prairies, St. Louis, April 1842, Riehl 342 (NYB); along Mo. South. RR., Reynolds Co., May 2, 1908, Smith 274 (UW); prairie northeast of Springfield, Aug. 21, 1912, Standley 9129 (USN); dry upland glade 2 mi. southeast of Osage Hills, St. Louis Co., May 5, 1928, Steyermark 933 (MBG); natural prairie between Caplinger Mills and Stockton, about 3 mi. north of Stockton, Cedar Co., July 13, 1934, Steyermark 13421 (MBG); Rose Hill, May 8, 1887, Wisliamus 725 (MBG); Shepard Mtn., Ironton, May 9, 1925, Woodson 324 (MBG); Greene Co., April 28, 1888, Weller (MBG).

ARKANSAS: Fort Smith, 1853-4, Bigelow (NYB,USN); glades Carroll Co., May 9, 1936, Bush 16376 (MBG); wooded sandstone hillside, Boston Mtns., Cass, Franklin Co., April 25, 1935, Fassett 17364 (UW); scarce, dry hillsides, Fayetteville, May, Harvey (UM); dry prairies and hills, northwest Arkansas, May, Harvey 7 (NYB); rocky hillsides, base of Rich Mtn., Polk Co., April 28, 1935, Lodewyks 203 (MBG); open rocky hillsides, Eureka Springs, Carroll Co., May 12, 1914, Palmer 5563 (MBG,USN); rocky open ground, near Hot Springs, Garland Co., April 13, 1924, Palmer 24494 (MBG); rocky open woods, Sugarloaf Mtn., near Midway,

Sebastian Co., April 8, 1928, Palmer 33276 (MBG); no definite locality, Pitcher (ANSP); Fayetteville, June 1925, Watts (UW).

NEBRASKA: near Lincoln, Lancaster Co., May 27, 1873, Aughey (UN); Lincoln, Lancaster Co., May 20, 1904, Bates 3180 (GH,UM,UN); Valparaiso, Saunders Co., May 16, 1879, Cleburne (UN); prairies, Tecumseh, Johnson Co., May 1895, Corson (UN); frequent locally on prairie near Fremont, Dodge Co., May 1894, Engberg (UN); rich bottoms and upland prairies, Platte Valley 50 mi. above Monk, June 1857, Hayden (MBG); no definite locality, coll. of 1869, Hayden (ANSP); common on high prairie along RR., 5 mi. west of Lincoln, Lancaster Co., May 20, 1934, Morrison 951 (MBG); Wahoo, Saunders Co., June 1890, ex Herb. Rydberg (UN); over whole prairie, flowering on south slope, May 12, 1927, Steiger (UN); Lincoln, Lancaster Co., May 1887, Weber (MBG,UN); Lincoln, Aug. 1898, Williamson (ANSP).

KANSAS: 1 mi. west of Pleasanton, May 14, 1929, Anderson (MBG); prairies, McPherson, June 1887, Bodin (UM); prairie, Greenwood Co., May 1, 1879, Broadhead (MBG); Lawrence, Douglas Co., May 19, 1892, Carleton (KA); Garrison, May 10, 1886, Cleburne (UN); Perry, Jefferson Co., Oct. 12, 1896, Clothier (KA); Marshall Co., July 25, 1897, Clothier & Whitford (KA); Atchison Co., Aug. 2, 1897, Clothier & Whitford (KA); Miami Co., Aug. 8, 1897, Clothier & Whitford (KA); Linn Co., Aug. 9, 1897, Clothier & Whitford (KA); Labette Co., Aug. 18, 1897, Clothier & Whitford (KA); Montgomery Co., Aug. 19, 1897, Clothier & Whitford (KA); Elk Co., Aug. 20 & 21, 1897, Clothier & Whitford (KA); Cowley Co., Aug. 22, 1897, Clothier & Whitford (KA); Sumner Co., Aug. 28, 1897, Clothier & Whitford (KA); Harvey Co., Aug. 24, 1897, Clothier & Whitford (KA); Sedgwick Co., Aug. 24, 1897, Clothier & Whitford (KA); Woodson Co., Aug. 29, 1897, Clothier & Whitford (KA); Coffey Co., Aug. 31, 1897, Clothier & Whitford (KA); Osage Co., Sept. 2, 1897, Clothier & Whitford (KA); near Valley Center, 1880, Edmondson (OU); Cloud Co., 1930, Fraser 329 (UW, KA); Perley's Hill north of Emporia, May 9, 1891, Gillett (KA); Roper, Wilson Co., May 5, 1896, Haller (KA); abundant on sandy soil 2 mi, southwest of Iron Mound, Saline Co., April 19, 1930, Hancin 156 (KA); hilltop near Manhattan, Riley Co., May 21, 1920, Herr (KA); Eureka, Greenwood Co., July 1892, Hitchcock (KA); White Water, Butler Co., July 1892, Hitchcock (KA); Olathe, Johnson Co., Aug. 1892, Hitchcock (KA); Chase Co., Aug. 1895, Hitchcock (KA); Marion Co., Aug. 1895, Hitchcock (KA); Cherokee Co., May 1896, Hitchcock (KA); Geary Co., June 1896, Hitchcock (KA); Allen Co., July 1896, Hitchcook (KA); Franklin Co., July 1896, Hitchcock (KA); Chautauqua Co., Aug. 8, 1896, Hitchcock (KA); Montgomery Co., Aug. 1896, Hitchcock (KA); Kingman Co., Aug. 23, 1898, Hitchcock (KA); Atchison Co., Oct. 3, 1896, Hitchcock (KA); Manhattan, Riley Co., May 10, 1888, Kellerman (MBG,KA); upland prairie west of Wabaunsee, Wabaunsee Co., April 29, 1927, Maus 51 (KA); upland prairie north of Auburn, Shawnee Co., July 4, 1927, Maus 343 (KA); Reno Co., 1898, Murphy (KA); near Altamont, Labette Co., May 11, 1924, Nelson (KA); White City, Morris Co., May 17, 1893, Norton (KA); prairie, Riley Co., June 17, 1895, Norton 77 (MBG,KA,NM); Chapman Twp., Ottawa Co., May 17, 1888, Panton 12 (KA); Topeka, Shawnee Co., May 5, 1879, Popenoe (KA); Arkansas City, 1881, Price (KA); Emporia, May 4, 1890, Tyler (MBG); near Eldorado, Butler Co., May 12, 1897, Smith (ANSP); Wichita, Sedgwick Co., May 1929, Wellman (UW); Cowley Co., April 1898, White (MBG,KA).

OKLAHOMA: rocky prairie, Wichita Nat. Forest, April 26, 1930, Angst 1427 (UO); woods west of Tecumseh, May 2, 1932, Barkley 136 (UO); dry upland 3 mi. east of Norman, April 22, 1928, Barkley (UO); prairie 2 mi. east of Norman, May 19, 1924, Bruner (UW,UO); 7 mi. northeast of Mangum, April 30, 1931, Bull 110 (UO); common on prairies, Sapulpa, July 22, 1894, Bush 59 (MBG); common, Sapulpa, May 4, 1895, Bush 1115 (MBG,ND); without definite locality, 1877, Butler (MBG); wooded mountain side, north of Wilburton, Latimer Co., June 13, 1930, Clark 2821 (UO); vicinity of Fort Sill, April 17, 1916, Clemens 11622 (MBG); low hills, Asher, Pottawatomie Co., April 10, 1936, Demarce 11970 (MBG); low clay hills, sandy ridges, Antlers, Choctaw Co., April 10, 1936, Demarce 11995 (MBG,NYB); Norman, April 6, 1915, Emig 437 (MBG); 6 mi. northwest of Stillwater, May 18, 1931, Featherly (MBG); prairie east of Boyd, May 14, 1927, Fielder 59 (UO); wasteland near Atoka, April 6, 1928, Folsum 65 (UO); common, gravelly hillsides near Tishomingo, Johnston Co., April 8, 1916, Houghton 3603 (MBG); on roadsides and in pastures, Norman, Cleveland Co., April 24, 1917, Jeffs (UO); prairie, northeast of Oklahoma City, April 29, 1928, Johnston (UO); vicinity of Fort Tawson, Choctaw Co., May, Leavenworth (NYB); Muskogee Co., April 10, 1927, Little 1257 (UO); Stillwater, May 1, 1897, Myers (OU); open woods at Interstate Bridge, southern Oklahoma, April 11, 1928, Nelson 10817 (MBG); chiefly on the False Washita River between Fort Cobb and Fort Arbuckle, coll. of 1868, Palmer 119 (NYB); open woods on mountain side near Page, LeFlore Co., Sept. 9, 1913, Stevens 2762 (UM).

TEXAS: near Lyons, Burleson Co., Mar. 1927, Martin 7242 (UT); Bonham, April 13, 1896, Milligan (USN); Denison, Grayson Co., April 10, 1933, Polson 14 (UT); no definite locality, coll. of 1839, Mohr (USN); prairies, Paris, April 10, 1904, Reverchon (MBG); no definite locality, Wright (ANSP).

SOUTH DAKOTA (†): no definite locality, coll. of 1865, ex Herb. Glatfelter (MBG).

16. B. leucophaea Nutt. var. glabrescens Larisey, var. nov.<sup>26</sup> As the species except less pubescent throughout, and stem glabrous.

Distribution: prairies and rocky open woods, Wisconsin, southwest to Louisiana and Texas.

CITATION OF SPECIMENS:

LOUISIANA: prairies, Crowley, Mar. 24, 1908, Brainerd (GH); prairie, Minden, April 15, 1901, Trelease (MBG); open woods near Chestnut, Natchitoches Parish, April 19, 1934, Wherry (UP).

WISCONSIN: valley of the Wisconsin River, near Pedanwell Rock, Juneau Co., July 18, 1894, Cheney (UW); sand at foot of Trempealeau Mtn., Trempealeau Co., June 1, 1935, Fassett & Hansen 17368 (UW); roadside, Fall Creek, Eau Claire Co., June 15, 1928, Kunz 102 (UW); Camp Douglas, July 7, 1890, Mearns 225 (USN).

MISSOURI: Rolla, April 28, 1915, Bridge (LB); woods, Grandin, May 8, 1905, Bush 2755 (MBG); open woods, Pontiac, April 24, 1934, Bush 13304 (MBG);

<sup>\*</sup>Ab specie differt omnino minore pubescentia et caule glabro.

wooded hills, Lane's Prairie, May 8, 1934, Bush 13469 (MBG); Potosi, June 3, 1892, Dewart (MBG); Victoria, July 1, 1871, Douglass (MBG); Ironton, May 12, 1893, Eggert (MBG); Allenton, May 2, 1896, Eggert (MBG,NYB); Meramee Highlands, 1905, ex Herb. Glatfelter (MBG); near Arcadia, Iron Co., May 1925, Greeman 4780 (MBG); Victoria, April 10, coll. of 1890, Hitchcock (MBG); Iron Mountain Lake, Iron Co., May 13, 1928, Kellogg 1798 (MBG); Pilot Knob, Iron Co., May 10, 1936, Larisey 4 (MBG,TYPE); flinty hill, Allenton, May 15, 1898, Letterman (MBG,USN); Jefferson Co., May 2, 1926, Mathias 835 (MBG); dry upland soil, about 3 mi. south of Catawissa, Franklin Co., May 12, 1929, Steyermark 886 (MBG); upland cherty woods above limestone bluffs along Big Piney River, near Hooker, Pulaski Co., May 4, 1934, Steyermark 8059 (MBG); prairie opening along RR. between Versailles and Stover, Morgan Co., July 8, 1934, Steyermark 13799 (MBG); cherty upland woods 3 mi. south of Corkery, Dallas Co., July 20, 1934, Steyermark 13799 (MBG).

ARKANSAB: woods, Fulton, April 14, 1905, Bush 2321 (MBG); rocky woods, Marion Co., April 24, 1934, Bush 13334 (MBG); dry woods near Eureka Springs, May 8, 1902, Canby, Sargent & Bush 27 (GH); on Grand Prairie about 0.5 mi. west of Screeton Prairie Co., May 1, 1923, Harper 27 (USN,GH,NYB,ANSP); on road-side 3 mi. east of Logan Gap Road on Highway 270, Montgomery Co., April 27, 1935, Lodewyks 174 (MBG); rocky ground, foot of Maumelle Mtn., near Pinnacle Station, Pulaski Co., June 1, 1923, Palmer 23012 (MBG); rocky open ground near High Point, Garland Co., April 25, 1924, Palmer 24547 (MBG); Judsonia, April 30, 1877, Reynolds (OU); on clay hills, Hot Springs, July 10, 1931, Runyon 1465 (USN).

OKLAHOMA: low hills by Big Taxodium, Broken Bow, McCurtain Co., April 11, 1936, Demaree 12061 (NYB); prairie near Ardmere, Carter Co., Stevens 74 (MBG).

TEXAS: Fannin Co., Milligan (NM); Goliad, Feb. 1927, Williams 7 (ANSP).

17. B. laevicaulis (Gray) Small in Bull. Torr. Bot. Club 25: 134. 1895; Small, Fl. Southeast. U. S., ed. 1, 601. 1903, and ed. 2, 601. 1913; Cocks, The Leguminosae of Louisiana. La. State Mus. Nat. Hist. Surv. Bull. 1: 6, pl. 7. 1910.

B. leucophaea Nutt. var. laevicaulis Gray in Hall's Pl. Texas, 7. 1873, nomen nudum; Canby in Bot. Gaz. 4: 132. 1879.

B. oxyphylla Greene, Leaflets Bot. Obs. 2: 84. 1910.

Plant 3–7 dm. high, darkening in drying, tawny-pubescent to villous in parts; stem stout, ribbed, glabrous, widely subdichotomously branched, branches divaricate; leaves subsessile to short-petiolate, petioles stout, channelled, semiamplexicaul, 2–4 mm. long, leaflets obovate to rhombic, strongly cuneate, apex acute, mucronate, 4–7 cm. long, 2–3.5 cm. broad, firm, finely reticulate, glabrous on both surfaces, ciliate along the margins and midvein, lateral leaflets more or less decurrent along the petiole; stipules ovate-lanceolate, acuminate, 1–3.5 cm. long,

reticulate, ciliate along the margins, persistent; racemes axillary, 1-2.5 dm. long, secund, declined; floral bracts ovate- to cordate-lanceolate, 1-2.5 cm. long, reticulate, ciliate along the margins, persistent; pedicels slender, 1.5-3.5 cm. long; calyxtube 1 cm. deep, glabrate within, densely ciliate along the margins, strongly nerved, upper lip distinctly two-lobed, lobes of the lower lip lanceolate-acuminate, 4-5 mm. long; corolla cream or yellow, standard suborbicular, deeply emarginate, 2 cm. high, 2 cm. broad, wings and keel 2.2-2.4 cm. long; ovary densely villous, mature pod ovoid-elliptic, inflated, 3-4 cm. long, 1.5-2.5 cm. broad, brownish-black, strongly reticulate, more or less appressed pubescent, long-stipitate, stipe exceeding the calyx 3-4 mm., body tapering gradually into a slender beak.

Distribution: prairies, Louisiana and Texas.

CITATION OF SPECIMENS:

LOUISIANA: longleaf-slash pine flat woods east of Hammond, Tangipohoa Parish, April 22, 1934, Brown 5956 (LU); pine woods, St. Helena Parish, April 24, 1934, Brown 5206 (LU); pine flat woods east of Hammond, Tangipohoa Parish, June 2, 1935, Brown 6345 (LU); cut-over longleaf pine hills north of Montpelier, St. Helena Parish, April 3, 1936, Brown 6192 (LU); pine-hardwood ridge in prairie area north of Crowley, Acadia Parish, April 26, 1936, Brown 6272 (LU); prairie along RR., west of Crowley, Acadia Parish, April 26, 1936, Brown 6282 (LU); prairie along RR., Esterwood, Acadia Parish, April 26, 1936, Brown 6291 (LU); common on "Hallaway" prairie near Hallaway Church east of Pineville, Rapides Parish, June 23, 1936, Brown 6433 (LU); Pearl River, Oct. 1901, Cocks (NYB, TYPE of B. oxyphylla Greene, (ND); open fields, Bayou LaCombe, April 1909, Cocks 1790a (TU); cleared pine woods, Bayou LaCombe, April 2, 1910, Cocks 1790b (NYB); prairies, Crowley, April 2, 1911, Cocks (TU); pine barrens, Covington, April 1913, Cocks (TU); no definite locality, Hale (ANSP); no definite locality, Hale 210 (NYB, TYPE); close soil, Alexandria, Hale (GH); in prairies, Opelousas, April 1880, Langlois (NYB); in prairies, Calcasieu, April 25, 1884, Langlois (NYB); in plains, Calcasieu Co., fl. April 26, 1884, Langlois (NYB); Chataignier, fr. May 20, 1884, Langlois 4 (NYB); in plains, Chataignier, St. Landry Co., May 20, 1885, Langlois 5 (NYB); in prairie, "Fakataite," near Chataignier, June 21, 1885; Langlois (NYB); in pine woods near St. Martinsville, May 1, 1893, Langlois (UM); low prairies, Jennings, Jefferson Davis Parish, May 15, 1915, Palmer 7614 (MBG,USN,ANSP); sandy soil, roadsides, and cut-over pine land, 2 mi. north of Tioga, Rapides Parish, April 6, 1935, Smith 97 (LU).

TEXAS: Colorado River, April 1828 (1849-1), Berlandier 289 (MBG, USN, NYB, UW); Virginia Point, April 15, 1899, Bray 22 (USN, UT); common on prairies, Columbia, April 9, 1899, Bush 67 (MBG); Fayette Co., 1892, Crawford 29 (USN); on Carizo sands, Terrell land, Wilson Co., Mar. 25, 1937, Cutler (MBG); occasional

on sand, 4 mi. south of Bandera, Bandera Co., Mar. 26, 1937, Cutler 881 (MBG); sand hills north of Longview, Gregg Co., April 19, 1899, Eggert (MBG); prairies north of Houston, Harris Co., April 21, 1899, Eggert (MBG); Houston, April 24, 1937, Fisher 37267 (USN); wet prairies, Houston, April 10, 1872, Hall 161 (MBG. USN,GH,NYB); Beaumont, May 1, 1936, Hooks (UT); Brenham, May 21, 1934, Lehman (UT); prairies west of Brazos, April 1939, Lindheimer (MBG); prairies northwest of Houston, May 19, 1840, Lindheimer 51 (MBG); near Houston, April 1842, Lindheimer (MBG,GH); no definite locality, Lindheimer & Buckley (ANSP); Vietoria, Victoria Co., Mar. 30, 1905, Lewton 73 (USN); Victoria, April 28, 1905, Maxon 3812 (USN); prairies of the Rio Grande, Meyer 7844 (NYB); sandy prairies, Columbia, Brazoria Co., Mar. 24, 1914, Palmer 5001 (MBG); prairies, Ganado, Jackson Co., Mar. 6, 1916, Palmer 9072 (MBG); prairies near Houston, Harris Co., April 15, 1928, Palmer 33316 (MBG,GH); 20 mi. east of Houston, May 10, 1936, Penfound 1-16 (UT); common in sand, Big Sandy, May 27, 1901, Reverehon (MBG); near Houston, May 6, 1899, Rose 4192 (USN,GH,NYB); San Marcos and vicinity, Stanfield (NYB); Hallettsville, June 11, 1923, Tharp 2295 (USN,UT); sandy oak woods, Goliad, July 1, 1925, Tharp 3504 (USN,UT); Lovelady, April 20, 1933, Tharp (UT); dry sandy soil near Hearne, Robertson Co., Mar. 28, 1930, Wolff 1385 (USN); no definite locality, Wright (GH).

B. cuneata Small in Bull. Torr. Bot. Club 25: 139. 1898;
 Small, Fl. Southeast. U. S., ed. 1, 601. 1903, and ed. 2, 601. 1913.

Plant essentially glabrous, leaf margins slightly pubescent in bud; stem firm, ribbed, sparingly branched, branches subdichotomous, ascending; leaves subsessile, occasionally shortpetiolate, petioles 2-4 mm. long, leaflets obovate, cuneate, mucronate, 3-6 cm. long, 2.5-3.5 cm. broad, leathery, barely reticulated, glabrous, slightly discolored in drying; stipules lanceolate to ovate-lanceolate, 0.5-1 cm. long, persistent; racemes 1 dm. long, opposite the branches, erect; floral bracts lanceolate to ovate-lanceolate, acuminate, 1-2 cm. long, lowermost sometimes 3 cm. long, usually persistent; pedicels slender, 1.5-2.5 cm. long, 3.5 cm. long in fruit; calyx-tube reticulate, 1 cm. deep, 8-9 mm. wide, only slightly pubescent within, upper lip emarginate, lobes separating widely at shallow cleft, lobes of the lower lip ovate, acute, 4-5 mm. deep; corolla pale cream, standard deeply notched, 2 cm. high, 2 cm. broad, wings and keel 2-2.2 cm. high; ovary glabrous, occasionally ciliate along sutures; pods ovoid-elliptic, 2 cm. long, 1.3 cm. broad, brownish-black, firm, rugose, pubescent within, long stipitate, stipe 1.3 cm. long, abruptly long-beaked, beak 1.8 cm. long.

Distribution: in sand near the coast, Texas.

CITATION OF SPECIMENS:

Texas: "Las Animas de Matamoros al Rio de las Neueces," April 1834, Berlandier 2554 (GH,NYB,ANSP); Victoria, April 6, 1900, Eggert (MBG); along Neueces Bay, Neueces Co., April 3, 1894, Heller 1525 (NYB,TYPE, MBG,USN,GH, ANSP,OU,UN); sandy hills below Sarito, May 14, 1928, Tharp 5965 (USN,UT); Redfish Bay, Mar. 5, 1934, Tharp (UT); Katherine, Mar. 25, 1907, York (UT).

### 19. × B. intermedia Larisey, hyb. nov.27

= B. leucophaea var. glabrescens × B. viridis.

Plant 0.5-1 m. high, tawny-, or occasionally whitish-pubescent throughout, darkening slightly in drying; stem somewhat stout, firm, heavily ribbed, pubescent when young, glabrate in age, primary stem geniculate, simply but widely branched, branches ascending; leaves compound, short-petiolate, petioles stout, semiamplexicaul, channeled, 2-5 mm. long; leaflets spatulate-elliptic to oblanceolate, occasionally rhombic-cuneate, acute, rarely retuse at the apex, somewhat delicate but firm, reticulate, pubescent above and below when young, glabrate in age, frequently ciliate along the margins and midvein, 5-7 cm. long, 1.5-2.5 cm. broad; stipules ovate, cordate-lanceolate to lanceolate, reticulate, 0.5-1.2 cm. long, usually persistent; racemes axillary, compact, erect, slightly flexuous, 1-3 dm. long; flowers numerous, closely spaced, ascending; floral bracts ovate-to cordate-lanceolate, reticulate, 0.8-1.5 cm. long, persistent; pedicels slender, 0.5-1 cm. long; calyx-tube 0.8-1 cm. deep, upper lip entire, barely cleft to slightly emarginate, lobes of the lower lip lanceolate, 4-5 mm. long; corolla yellow, standard 1.6-1.8 cm. high, 1.4-1.6 cm. broad, wings and keel 2-2.2 cm. long; ovary densely pubescent, mature pod unknown.

Distribution: prairies, Louisiana and Texas.

CITATION OF SPECIMENS:

LOUISIANA: pine-hardwood ridge in prairie area north of Crowley, Acadia Parish, April 26, 1936, Brown 6273 (LU); prairie west of Crowley, Acadia Parish, April 26, 1936, Brown 6276 (LU); prairies, Lake Charles, April 1914, Cocks (TU); no definite locality, May, Hale 309 (ANSP); prairie about 1 mi. west of Crowley, Acadia Parish, April 7, 1936, Harper 3476 (MBG,TYPE, USN,GH,NYB,ANSP).

TEXAS: Rosenberg, April 5, 1900, Eggert (MBG); Houston, April 2, 1930, Fisher 71 (USN).

<sup>&</sup>quot;Inter leucophaeam et viridem media. Herba 0.5–1.0 m. alta, ramis ascendentibus. Polia composita, foliolis elliptico-spatulatis vel oblanceolatis fere rhombo-cuneatis spice acutis raro retusis. Racemi axillaros erecti paulo flexuosi.

20. × B. stricta Larisey, hyb. nov.28

= B.  $leucophaea \times B$ . sphaerocarpa.

B. villosa Nutt. ex Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 266, fig. 2051. 1897, in part, and ed. 2, 2: 345, fig. 2455. 1913, in part; Gray, New Man. Bot., ed. 7, 506. 1908, in part.

Plant finely tawny-villous throughout, darkening into deep brown or black in drying; stem erect, simply branched. branches ascending; leaves subsessile to short-petiolate, petioles 1-2 mm. long; leaflets oblanceolate-elliptic, apex rounded. only rarely retuse, 4-7 cm. long, 1-2 cm. broad, lateral leaflets usually converging; stipules ovate-lanceolate, acuminate, usually 1-2 cm. long, sometimes less, horizontal or pendulous, usually persistent; racemes opposite the branches, erect, compact, 1-2 dm. long, flowers ascending, slender pedicels closely appressed to axis, 1-2.5 cm. long; calyx-tube 0.8-1 cm. deep, upper lip barely cleft, lobes of the lower lip lanceolate, 3-4 mm. deep; floral bracts persistent, lowermost sometimes foliaceous, ovate-acuminate, 1-1.5 cm. long, uppermost lanceolate, usually less than 1 cm. long; corolla yellow, standard 1.5 cm. long, wings on keel 2 cm. long; ovary densely villous, mature pod unknown.

Distribution: prairies, Arkansas and Oklahoma.

CITATION OF SPECIMENS:

ARKANSAS: Baker Springs, Howard Co., April 22, 1909, Kellogg (MBG); no definite locality, Nuttall (ANSP, TYPE, NYB); 3 mi. north of Kirby, April 14, 1932, Wilkins 1417 (USN).

OKLAHOMA: prairies, Bryan Co., April 21, 1932, Blain 238 (USN); prairie, 10 mi. north of Limestone Gap, May 18, 1877, Butler (MBG).

21. B. Bushii Small, Fl. Southeast. U. S., 600, 1331. 1903, and ed. 2, 600. 1913.

Plant 5-7 dm. high, more or less woolly-tomentose throughout; stem stout, ribbed, diffusely branched, branches subdichotomous; leaves sessile to short-petiolate, petioles less than 3 mm. long, pale green, leaflets sessile, blades thick, oblanceolate to rhombodial, cuneate, acute or obtuse, 3-6 cm. long, 1.5-2.5

<sup>&</sup>quot;Inter leucophaeam et sphaerocarpam media; foliolae oblanceolato-ellipticae apice rotundatae raro retusae; racemi axillares non secundi, flores erecti; corolla flava.

e

cm. wide, finely reticulate; stipules ovate-lanceolate to lanceolate, 0.5–2 cm. long, persistent; racemes numerous, axillary, 1–2 dm. long, secund, somewhat flexuous, ascending; floral bracts ovate to ovate-lanceolate, 1–2 cm. long, persistent; pedicels slender, 0.5–3 cm. long; calyx-tube 1 cm. deep, upper lip entire, subconnate or emarginate, lobes of the lower lip deltoid-lanceolate, 2–3 mm. long; corolla cream-yellow, standard 1.8–2 cm. high, 1.4–1.6 cm. broad, wings and keel 2.2–2.4 cm. long; ovary villous, mature pod ligneous, ovoid, inflated, 2 cm. long, 1.5 cm. broad, strigillose, rugose, somewhat reticulate, stipe equalling the length of the calyx, long-beaked, beak equalling the length of the body.

Distribution: prairies, eastern Texas.

CITATION OF SPECIMENS:

TEXAS: common on prairie, Columbia, April 9, 1899, Bush 68 (NYB,TYPE, MBG, USN,GH,ND); Boca Chica, Cameron Co., Mar. 31, 1933, Clover 769 (NYB); "Rio Brazos," 1833, Drummond (GH); Sutherland Springs, April 2, 1932, Jones 29325 (MBG); on flats by Gulf of Mexico near Corpus Christi, April 6, 1932, McKelvey 1743 (USN,GH); Aransas Pass, San Patricio Co., May 1913, Oroutt 5963 (MBG); Galveston, April 18, 1906, Tracy 9346 (MBG,USN,GH,NYB,UP,UM,UW,UN,UT).

22. B. alba (L.) Vent. Dec. Gen. Nov. 9. 1808, without description; R. Br. in Ait. Hort. Kew. ed. 2, 3: 6. 1811, with description; Ell. Sketch Bot. S. Car. & Ga. 1: 468. 1821; DC. Prodr. 2: 100. 1825; Torr. & Gray, Fl. N. Am. 1: 386. 1840; Chapman, Fl. South. U. S., ed. 1, 112. 1860, ed. 2, 112. 1889, and ed. 3, 122. 1897; Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 267, fig. 2053. 1897, in part, and ed. 2, 2: 346, fig. 2457. 1913, in part; Small, Fl. Southeast. U. S., ed. 1, 600. 1903, and ed. 2, 600. 1913; Gray, New Man. Bot., ed. 7, 506. 1908; Small, Man. Southeast. Fl. 677. 1933.

B. albiflora Raf. New Fl. N. Am. 2: 47. 1836 [1837].

Crotalaria alba L. Sp. Pl. 2: 716. 1753.

Sophora alba L. Syst. Nat., ed. 12, 2: 287. 1767; Syst. Veg., ed. 13, 325. 1774.

Podalyria alba Willd. in L. Sp. Pl., ed. 4, 2: 503. 1799.

Plant 2 m. or less high, virtually glabrous, occasionally sparingly pubescent in parts; stem slender, dull yellow to purplishbrown in age, somewhat glaucous, subdichotomously branched,

branches geniculate, divaricate, lower ones frequently declined: leaves petiolate, petioles 0.4-1.2 cm. (average 0.5-0.8 cm.) long, occasionally slightly pubescent, leaflets spatulateoblanceolate to obovate, cuneate, apex usually rounded, slightly apiculate or retuse, rarely acute, 2-3 cm. long, 0.8-1.0 cm. wide, glabrous and glaucous beneath; stipules minute, deltoid-lanceolate to setaceous, mostly caducous; racemes 2.5-5 dm. (average 4 dm.) long, flowers subverticillate; floral bracts oblanceolate, 5-7 mm. long, sometimes ciliate at margins, caducous; pedicels usually shorter than the calyx, 2-4 mm. long, though at times twice as long as the calyx, 0.8-1 cm. long; calyx-tube 4-5 mm. deep, usually as wide as deep, upper lip entire, lobes of lower lip deltoid to broadly ovate, 1.5-2.5 mm. long; corolla white, standard sometimes splotched with purple, reflexed, 1-1.2 cm. high, 1.1-1.3 cm. wide, wings and keel less than 1.5 cm. long; fruit cylindrical, inflated, dusky brown, 2.5-3 cm. long. 0.5-1 cm. broad, long-stipitate, stipe 0.8-1 cm. long, abruptly short-beaked.

Hybridizes with B. tinctoria var. crebra in eastern Virginia. Distribution: dry sandy pinelands, eastern Virginia south to Florida.

CITATION OF SPECIMENS:

VIRGINIA: Accomac, Aug. 1923, Jones (UP); in open stand of Pinus Taeda, 3.5 mi. north of Accomac, Accomac Co., June 29, 1928, Jones (MBG); in dry sandy field north of Accomac, Accomac Co., May 19, 1930, Moldenke 1255 (MBG, NYB,UP,DU); open pine woods 4 mi. north of Accomac, Accomac Co., May 31, 1937, Tatnall 3363 (ANSP); sandy soil in open pine woods 4 mi. north of Accomac, Accomac Co., June 29, 1928, True (UP).

NORTH CAROLINA: Guilford, July 1895, Ashe (MBG); Asheboro, June 1898, Ashe (FM); Statesville, June 6, 1879, Gray, Sargent, Redfield & Canby (ANSP); woods, Statesville, June 6, 1879, Redfield 11701 (MBG); Statesville, June 1878,

Hyams (USN).

SOUTH CAROLINA: sand dunes, southern border of Williamsburg Co., May 21, 1930, Bright 2955 (ANSP); Aiken, May 1869, Canby (MBG,USN,GH,NYB,ANSP,FM); Columbia, May 9, 1899, Canby & Sargent 19 (GH); Aiken, May 1888, Darlington (FM); Anderson Co., 1885, Gibbes (NYB); woods near Clemson, Pickens Co., May 18, 1907, House 3359 (NYB); vicinity of Columbia, May 1888, McCarthy (USN); Columbia, June 4-7, 1894, MacFarlane (UP); Aiken, April 1871, Smith (UP); dry pine woods, Columbia, April 1890, Taylor (FM); dry sandy open longleaf pine woods near North, Orangeburg Co., April 26, 1932, Weatherby 6111 (USN,GH,NYB).

GEORGIA: Augusta, Curtis (ANSP); Augusta, June 1894, MacFarlane & Davis

(UP); dry sandy field south of Kingsland, Camden Co., May 12, 1930, Moldenke 11794 (NYB,UP); middle Ga., May 6, 1846, ex Herb. Porter (ANSP); dry sand-hills 3 mi. east of Butler, Taylor Co., April 30, 1938, Pyron & MoVaugh 2799 (MBG); dry roadside 1.25 mi. north of Cleveland, White Co., May 14, 1938, Pyron & MoVaugh 2883 (MBG); Ocmulgee River Swamp below Macon, May 18-24, 1895, Small (NYB).

FLORIDA: no definite locality, coll. of 1846, Chapman (MBG); Quincy, Chapman (MBG); Gadsden Co., coll. of 1889, Chapman (MBG,USN); no definite locality, Chapman (NYB,UW); "in pinetis, prope Quincy," May 1843, Rugel (NYB); pinelands near Wewahitchka, May 7, 1926, Small, Mosier & Matthaus (NYB); field, Quincy, April 19, 1930, Tisdale & West (MBG).

23. B. albescens Small, Fl. Southeast. U. S., ed. 1, 600, 1331. 1903, and ed. 2, 600. 1913; Small, Man. Southeast. Fl. 677. 1933.

Plant 1 m. or less high, slightly pubescent throughout, frequently glabrate in age; stem slender, firm, lemon through deep vellow to tan in age, glaucous, subdichotomously branched, inner branches ascending, outer sometimes widely spreading; leaves petiolate, petioles slender, 0.5-1.8 cm. (average 1.2-1.5 cm.) long, pubescent; leaflets elliptic to obovate, sometimes slightly cuneate, rounded and slightly retuse at the apex, or acute and finely mucronate, 3.5-6 cm. long, 1-1.5 cm. broad, pubescent on lower surface especially along the midrib, usually glabrous above; stipules minute, deltoid, subulate to setaceous, caducous, or lanceolate, 5 mm. long, persistent; raceme 1.5-4 dm. (average 2.5 dm.) long, flowers subverticillate; floral bracts oblanceolate, 5-7 mm. long, ciliate, caducous; pedicels rarely longer than the calyx, 5-6 mm. long; calyx-tube 5-6 mm. deep, upper lip entire or slightly emarginate, lobes of the lower lip deltoid 1.5-2 mm. long; corolla white, standard not conspicuously reflexed, 1.3-1.5 cm. high, 1.5-1.8 cm. wide, wings and keel usually more than 1.5 cm. high, exceeding the standard by about 2 mm.; mature pod cylindical, inflated, 3.5 cm. long, 1 cm. broad, yellow-brown, reticulate, short-stipitate, stipe barely exceeding the calyx.

Hybridizes with B. perfoliata in Georgia.

Distribution: sandy pine woods, North Carolina and Tennessee, south to Georgia.

CITATION OF SPECIMENS:

NORTH CAROLINA: no definite locality, Curtis (NYB); roadside, Mayodan, June 3, 1928, Schallert 8456 (DU); Flat Rock, coll. of 1861, ex Herb. Gibbes (NYB).

SOUTH CAROLINA: Oconee Co., May 27, 1897, Anderson (UM); no definite locality, Backman (ANSP); Columbia, May 16, 1912, Bartram (NYB); sandy barrens, S. Williamsburg Co., May 21, 1931, Bright 2955 (GH); pine barrens, Summerville, May 1892, Brownfield 643 (UW); "in umbrosis humidis," Elliott (CM); open pine woods, Summerville, May 22, 1855, ex Herb. Hexamer & Maier (GH); sandy hillside near Black Creek between Hartsville and Dovesville, about 5 mi from Hartsville, June 7, 1921, Norton (USN); Summerville, April 29-May 10, 1918, Perkins (GH); Santee Canal, May, Ravenel (GH,CM); Batesburg, May 22, 1911, McGregor 656 (USN); Summerville, Taylor (USN); pine woods, Summerville, June 1891, Taylor (UM); Seneca, Oconee Co., May 1879, Trelease (MBG).

GEORGIA: pine barren, Thomson, McDuffle Co., June 15, 1911, Bartlett 2651 (KA); no definite locality, Boykin (ANSP); wooded hillsides in good soil, Augusta, May 15, 1900, Cuthbert (NYB); no definite locality, LeConte (NYB); Macon,

Loomis (NYB); near Butler, Taylor Co., Neisler (NYB).

TENNESSEE: Polk Co., May 15, 1892, Ruth (OU); open woods, Knoxville, May 1897, Ruth 2217 (NYB,TYPE); thickets, Thompson's, E. Tenn., May 1897, Ruth (OU); woodlands, Hiawassee Valley, May 1898, Ruth (MBG,NYB,ND).

### 24. B. pendula Larisey, sp. nov.29

Height unknown; plant glabrous, somewhat glaucous throughout; stem firm, slender, subdichotomously branched, branches strongly geniculate, spreading, declined; leaves petiolate, petioles 0.8–1.3 cm. long; leaflets elliptic, frequently oblanceolate when young, sometimes slightly cuneate, 4–6 cm. long, 1–2 cm. wide, acute, rarely rounded at apex except occasionally in age, never retuse, margins revolute, texture firm, primary vein deeply impressed, secondary veins regularly placed, nearly parallel, area bordering them usually remaining conspicuously pale; stipules subulate to setaceous, seldom ex-

Herba omnino glabra sat glauca altitudine ignota. Caulis graciliusculus firmus subdichotome ramosus; ramis valde genicul is patulis. Folia petiolata, petiolis 8-13 mm. longis; foliolis ellipticis vel immaturitate saepe oblanceolatis apice acutis raro rotundatis haud retusis basi cuneatis 4-6 cm. longis 1-2 cm. latis firmiter membranaceis margine post exsiccationem revolutis, nervo medio profunde impresso venis secundariis regulariter parallelis parenchymate prope nervum venosque post exsiccationem pallidissimo haud nigrescente, stipulis subulatis vel setaceis ca. 3 mm. longis saepissime caducis. Racemi numerosi erecti compacti folia vix superantes 1.5-2.5 cm. longi, bracteis caducis, pedicellis 4-7 mm. longis. Flores subverticillati, calycis tubo 6-8 mm. longo, labro superiore ovato-rotundato vel truncato vel vix emarginato tubum ca. dimidio aequante, labri inferioris lobis deltoideis 2-3 mm. longis, corollae albidae (†) vexillo 1.5 cm. longo 1.2 cm. late, alis carinaque 1.7-2.0 em. longis. Legumen pendulum breviter stipitatum oblongoideum valde inflatum 4.0-4.5 cm. longum 1.5-2.0 cm. latum abrupte breviterque sed anguste rostratum (rostro ca. 5 mm. longo) nigro-pruinosum firmum sed tenue et fragile indistincte reticulatum, stipite calycem vix superante.

ceeding 3 mm. in length, mostly caducous; racemes numerous, erect, barely exceeding the foliage, compact, 1.5–2.5 dm. long; flowers subverticillate, floral bracts caducous; pedicels 4–7 mm. long; calyx-tube 6–8 mm. deep, upper lip ovate, rounded to slightly truncate or barely emarginate, one-half the length of the tube, lobes of the lower lip deltoid, 2–3 mm. long; corolla white (†), standard 1.5 cm. high, 1.2 cm. broad, wings and keel 1.7–2 cm. long; mature pod pendulous, short-stipitate, stipe barely exceeding the calyx, body oblongoid, much inflated, black, pruinose, firm but thin and brittle, lightly reticulate, 4–4.5 cm. long, 1.5–2 cm. broad, abruptly short- but slender-beaked, beak 5 mm. long.

Distribution: dry open pine woods and upland sand ridges, lower South Carolina, Georgia and upper Florida.

CITATION OF SPECIMENS:

SOUTH CAROLINA: Bluffton, June 1879, Mellichamp (GH); Bluffton, Beaufort Co., Aug. 1879, Mellichamp (NYB); Santee River bottom west of St. Paul, Clarendon Co., May 11, 1917, Stone 616 (ANSP); Hardeeville, April 1894, Williamson (ANSP).

GEORGIA: dry open woods bordering the Flint River near Bainbridge, June 19, 1901, Curtiss 6810 (MBG,TYPE, USN,GH,NYB,UN,UM,KA,COTYPES); rare on drier upland sand ridges, cut-over pine woods and pastures, Tift Co., May 15, 1935, Stephens (MBG); shaded roadside south of Ways Station, Route 17, Bryan Co., April 18, 1935, Tees (ANSP); Savannah, Mar. 15, Williamson (FM).

FLORIDA: E. Fla., Garber (MBG); Rosewood, June 1876, Garber (ANSP); in low woods, Washington Co., May 22, 1885, Small (NYB).

## 25. B. pendula Larisey var. obovata Larisey, var. nov. 30

As the species except: leaflets shortly obovate, rounded and occasionally slightly retuse at the apex, 2-3.5 cm. long, 1-1.5 cm. broad; petioles not usually exceeding 5 mm., though sometimes 1 cm. long; terminal raceme exceeding the foliage 1-1.5 dm.; mature pod not known.

Distribution: middle South Carolina.

CITATION OF SPECIMENS:

SOUTH CAROLINA: Columbia, Richland Co., May 16, 1912, Bartram (ANSP); along roadside about 15-20 mi. north of Columbia, May 6, 1937, Coker (UNC, TYPE, NYB, COTYPE); Newberry Road 5 mi. from Columbia, May 1936, Philson (DU).

<sup>\*\*</sup>Ab specie differt foliolis breviter obovatis apice rotundatis saepe paululo retusis 2.0-3.5 cm. longis 1.0-1.5 cm. latis, petiolis plerumque 5 mm. longis, rarissime usque ad 1 cm. longis; racemo terminali folia superante 1.0-1.5 dm. longo; legumine maturo ignoto.

26. B. pendula Larisey var. macrophylla Larisey, var. nov. As the species except: stems stouter, branches longer, leaflets somewhat more delicate, broadly elliptic to obovate, only rarely cuneate, obtuse or rounded at apex, frequently retuse,

4-6 cm. long, 2-2.5 cm. broad.

Distribution: middle and lower Georgia; localized in Kentucky near Paducah.

CITATION OF SPECIMENS:

GEORGIA: Marshallville, June 8, 1895, Earle 3120 (NYB); below Augusta, April 1847, ex Herb. Porter (ANSP); Experiment, June 2, 1899, Riegel 29 (KA); along Flint River at Albany, Dougherty Co., May 24-28, 1895, Small (FM,NYB). KENTUCKY: Tennessee-Cumberland River region, Paducah, McCracken Co., May

30-June 20, 1909, Eggleston 4495 (NYB); open ground along small streams near Paducah, McCracken Co., June 17, 1920, Palmer 17935 (MBG,TYPE).

27. B. leucantha Torr. & Gray, Fl. N. Am. 1: 585. 1840; Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 267, fig. 2054. 1897, and ed. 2, 2: 346, fig. 2458. 1913, in part; Small, Fl. Southeast. U. S., ed. 1, 600. 1903, and ed. 2, 600. 1913, in part; Gray, New Man. Bot., ed. 7, 506. 1908, in part; Rydb. Fl. Prairies & Plains Central N. Am. 455. 1932, in part; Small, Man. Southeast. Fl. 678. 1933, in part.

Podalyria alba Sims in Curt. Bot. Mag. 29: pl. 1177. 1809,

not B. alba R. Br., not Sophora alba L.

Plant 1.5-2 m. high, glabrous throughout, glaucous, blackening in drying; stem solitary, stout, succulent, heavily ribbed, widely but simply branched, branches ascending, usually straight but occasionally slightly geniculate toward the ends; leaves deep green, blackening early, petiolate, petioles 5-10 mm. long, or upper leaves often subsessile, leaflets cureate-obovate to nearly elliptic or oblanceolate, 2.5-6.5 cm. long, 1.5-3 cm. broad, obtuse, retuse, or mucronate at the apex, undulate, sometimes revolute; stipules lanceolate, usually about the length of the petioles though sometimes less, mostly caducous; racemes few, stout, erect, flexuous, central raceme 2-6 dm. long, lateral ones usually not exceeding 4 dm.; flowers numerous,

<sup>&</sup>lt;sup>38</sup>Ab specie differt caulibus crassioribus, ramulis longioribus; foliolis paulo delicatioribus late ellipticis vel obovatis raro cuncatis apice obtusis vel rotundatis sacpe retusis 4-6 cm. longis 2.0-2.5 cm. latis.

subverticillate, usually horizontal or occasionally slightly ascending, pedicels 3–10 mm. long; floral bracts ovate-lanceolate, 8–10 mm. long, usually caducous; calyx-tube 7–9 mm. long, almost as broad, densely white-pubescent within, upper lip entire or slightly emarginate, lobes of the lower lip ovate-deltoid, one-half to one-third the length of the tube; corolla white, standard splotched with purple, 1.3–1.5 cm. high, 1.5–1.8 cm. broad, wings and keel 2–2.5 cm. long; mature pod firm, black, glaucous, ovoid to oblong, 2.5–4 cm. long, 1–2 cm. broad, slender-stipitate, stipe 2–3 times as long as the calyx, abruptly short-beaked.

Hybridizes with B. tinctoria var. crebra in Indiana, B. sphae-rocarpa in Oklahoma, and B. viridis in Louisiana and Texas.

Distribution: open prairies, woods, and waste fields, Michigan to Minnesota, southwest to Mississippi, Louisiana and Texas.

CITATION OF SPECIMENS:

MISSISSIPPI: low woods 10 mi. north of Bay St. Louis, April 30, 1926, Small,

Mosier & Matthaus (NYB).

Louisiana: prairie, RR. right-of-way between Scott and Duson, Lafayette Parish, April 19, 1936, Anderson & Hubricht (MBG); vicinity of Covington, Fairview, May 8, 1920, Arsène 11851 (USN); pine flat woods west of Covington, April 22, 1933, Brown 3967 (LU); pine flat woods 5 mi. east of Hammond, July 15, 1933, Brown 4088 (LU); Covington, May 1900, Cocks (LU); pine barrens, Covington, April 2, 1902, Cocks 1686 (NYB,TU); pine barrens, Pineville, April (2), 10, 1911, Cocks (NYB,LU,TU); Alexandria, Hale (NYB); plains, Abbeville, May 28, 1882, Langlois (NYB); Cat Island (Miss. delta & adjacent island), Aug. 26, 1900, Lloyd & Tracy 251 (NYB); open upland woods, Natchitoches, April 25, 1915, Palmer 7370 (MBG); dry open ground, Creston, Natchitoches Parish, April 14, 1916, Palmer 9427 (MBG,USN); hills near Bogalusa, May 2, 1926, Small, Mosier & Matthaus (NYB); silt loam, open prairie, Holloway Prairie, Rapides Parish, July 10, 1935, Smith 115 (LU).

OHIO: Paxton Twp., Ross Co., Nov. 2, 1930, Bartley & Pontius (OU); opening in pin- and white-oak swamp forest, Five-Mile, Brown Co., Nov. 3, 1932, Braun (LB); Georgesville, Franklin Co., July 2, 1900, Coberly (OU); West Union, Tiffin Twp., Adams Co., Sept. 13, 1933, Dodd (OU); Defiance Co., June 18, 1897, Fullmer (OU); near South Charleston, Clark Co., June 21, 1930, Gordon & Chapman (OU); upper Sandusky, Wyandot Co., Sept. 18, 1930, Hicks (OU); Pront's, Erie Co., June 9, 1895, Mosely (GH); Oxford, Erie Co., July 8, 1895, Mosely (USN,OU); Miami, Sartwell (GH); Madison Co., July 12, 1920, Taylor (OU); Dunn's Prairie, Madison Co., Sept. 1, 1928, Thomas (OU).

MICHIGAN: roadside, 2 or 3 mi. northeast of Schoolcraft, Kalamazoo Co., June 23, 1937, Anderson & Peck (MBG): roadside south of Bronson, Branch Co., July 6,

1929, Brown 2603 (WU); near Parma, Jackson Co., July 8, 1896, Camp & Camp (UM,UW).

INDIANA: clay hills near lakes in Jackson Twp., Wells Co., July 25, 1897, Deam (IU); high bank on east side of lakes in Jackson Twp., Wells Co., June 26, 1904, Deam (USN); in prairie condition near Clear Lake, Steuben Co., July 4, 1904, Deam (IU); on wooded sand dune near Hammond, Lake Co., Aug. 5, 1906, Deam 1428 (IU); wooded sand dunes between Pine and Gary, Lake Co., July 28, 1907. Deam 2344 (IU); in open wooded pasture about 4 mi. north of Goshen, Elkhart Co., June 23, 1910, Deam 6758 (CD); rather dry woods about 2 mi. west of Hovey Lake, Posey Co., May 23, 1911, Deam 8299 (IU); not frequent, in dry soil, along the Lake Erie RR. about 2 mi. north of Rochester, Fulton Co., June 25, 1911, Deam 8902 (CD); not frequent, in open sandy woods about 2 mi. south of Culver, Marshall Co., July 2, 1911, Deam 9064 (IU); in sandy soil on the exposed bank of Fishtrap Lake near Laporte, Laporte Co., Aug. 13, 1911, Deam 9609 (IU); in prairie habitat along the right-of-way, Lake Erie RR. west of Goldsmith, Tipton Co., July 9, 1913, Mrs. Deam 13,636 (IU); roadside 41/2 mi. southwest of Hanover, Jefferson Co., June 21, 1915, Deam 16,256 (CD); open white oak ridge about 1/2 mi. south of Lake Galacia about 5 mi. northeast of Fairmount, Grant Co., July 1, 1916, Deam 20,625 (CD); in an open sandy black- and white-oak woods 1½ mi. east of Mongo, Lagrange Co., July 9, 1916, Deam 20,699 (CD); rocky bar of Wabash River 3 mi. west of Huntington, Huntington Co., July 23, 1916, Deam 20,766 (IU); in white oak woods bordering the east side of New Lake, Whitley Co., Sept. 12, 1916, Deam 21,783 (IU); in hard clay soil along readside through the "flats" 1 mi. north of Midway, Spencer Co., June 9, 1918, Deam 25,265 (IU); right-of-way, Vandalia RR. near Haeckland about 7 or 8 mi. northeast of Terre Haute, Vigo Co., July 5, 1918, Deam 25,787 (IU); roadside along Pine Creek about 11/2 mi. south of Rainsville, Warren Co., July 8, 1919, Deam 25,877 (IU); right-of-way of the Penn. BR., 2 mi. east of Burnettville, July 9, 1918, Deam 25,905 (CD); in sterile soil on the crest of the wooded Van Buren ridge about 7 mi. east of Cannelton, July 22, 1919, Deam 28,464 (IU); sandy roadside 8 mi. northeast of South Bend, St. Joseph Co., July 8, 1920, Deam 31,386 (IU); dry hard clay roadside 1 mi. northeast of Crisman, Porter Co., July 10, 1920, Deam 31,568 (IU); wooded sand hill about 1/2 mi. southwest of Schneider, Lake Co., July 12, 1920, Deam 31,648 (IU); black oak woods 4 mi. southwest of Lake Village, July 13, 1920, Deam 31,682 (IU); black oak woods 3 mi. west of Gifford, Jasper Co., July 14, 1920, Deam 31,747 (IU); pin- and black-oak woods about 51/4 mi. southeast of North Judson, Starke Co., July 14, 1920, Deam 31,833 (IU); right-of-way of the Penn. RR. about 3 mi. east of Monticello, White Co., Aug. 4, 1923, Deam 39,347 (IU); in the old lake bottom of the east side of Bear Lake about 11/2 mi. southwest of Wolf Lake, Noble Co., June 25, 1929, Deam 47.035 (IU); roadside 1 mi. northeast of Otwell, Pike Co., Aug. 12, 1932, Deam 52,673 (IU); open place in H. H. Peele woods, 1 mi. southwest of Knox, Starke Co., June 24, 1938; Deam 58,992 (MBG); Lake Maxinkuchee, July 17, 1899, Evermann 754 (USN); Hanover, July 1887, Kearney (OU); common in pasture, Sleek's farm 34 mi. east of Yockey, Lawrence Co., June 25, 1933, Kriebel 708 (CD); open sandy woods, East Chicago, July 8, 1903, Lansing 2586 (GH); along beach, Michigan City, July 8, 1903, Mell 126 (USN); Chain Lakes, Oct. 10, 1912, Nieuwland 10372 (USN); Knox, June 1926, Rhoades (UW); clay soil, old field west of Buttermilk Creek, Sullivan Co., July 1, 1928, Steiner 5608 \$ 5609 (IU); sandy woods, Clarke, July 11, 1895, Umbach 641 (UW); dry sands, Clarke, June 15, 1895, Umbach (UM); woods, Clarke, June 30, 1897, Umbach (MBG); wood, Clarke, July 9, 1897, Umbach (GH); woods, Miller's, June 23, 1898, Umbach 7879 (UW); dunes, Aetna, July 7, 1900, Umbach 11185 (UW); swales, Pine, June 16, 1906, Umbach 1056 (22471) (UW); swales, Clarke, June 21, 1909, Umbach 3500 (31509) (UW); low meadow, Miller's, June 29, 1909, Umbach 3599 (31508) (UW); ½ mi. west of Fountain Park, roadside, Jasper Co., 1923, Welch 5818 (IU).

TENNESSEE: sandy fields, Henderson, May 1893, Bain 401 (NYB).

WISCONSIN: Galesville, Trempealeau Co., July 9, 1932, Anthony (UW); roadside, Montfort, Grant Co., June 28, 1929, Breakey (UW); open field, Hinsdale, Cook Co., July 28, 1926, Churchill (GH); Baraboo, July 1885, Curtis (UW); Raeine, July 9, 1880, Davis (UW); Hollandale, Iowa Co., Aug. 14, 1927, Davis (UW); Lynxville, Sept. 1, 1915, Denniston (UW); Iron Dell north of Mirror Lake, Sank Co., July 13, 1903, Eggert (MBG); Lake Denoon, Muskego, Wankesha Co., July 11, 1928, Ehrlers (UW); sand plain, north of La Crosse, La Crosse Co., Aug. 31, 1927, Fassett 4367 (UW); sandy roadside 2 mi. northwest of Pepin, Pepin Co., Aug. 7, 1934, Fassett 17782 (UW); roadside, prairie relic, New Diggings, Lafayette Co., Aug. 17, 1934, Fassett 16664 (UW); roadside & pasture, (T.8N.,R.5W.), Eastman, Crawford Co., Aug. 12, 1934, Fassett 16648 (UW); RR., Liberty, Grant Co., Aug. 15, 1934, Fassett 17786 (UW); sandy woods near White River between Berlin & Princeton, Green Lake Co., Sept. 12, 1934, Fassett 16536 (UW); sandy roadside 5 mi. north of Peysippi, Waushara Co., Sept. 14, 1934, Fassett 16538 (UW); roadside, Sprague, Juneau Co., Sept. 17, 1934, Fassett 16534 (UW); sandy roadside, Lemonweir, 5 mi. southeast of Mauston, Sept. 17, 1934, Fassett 16535 (UW); sandy roadside near Port Hope, about 8 mi. north of Portage, Marquette Co., Sept., Fassett 16539 (UW); 3 mi. north of Cassville, Sept. 28, 1934, Grant Co., Fassett 17783 (UW); sandy roadside near Silver Lake, Wild Rose, Waushara Co., June 30, 1935, Fassett 17789 (UW); shore of Lake St. Croix near Pierce Co. line, St. Croix Co., Aug. 21, 1935, Fassett 17772 (UW); Wisconsin River bottoms east of Necedah, Adams Co., Oct. 7, 1934, Fassett & Bushnell 16573 (UW); between Camp Douglas and Tomah, Oakdale, Monroe Co., Oct. 7, 1934, Fassett & Bushnell 16730 (UW); sandy soil, mouth of Beef River, Alma, Buffalo Co., Aug. 13, 1926, Fassett & Hotchkiss 3099 (GH,UW); roadside, Winchester, Winnebago Co., Oct. 26, 1935, Fassett & McGraw 17776 (UW); roadside east of Lancaster, Grant Co., May 31, 1930, Fernholz & Wadmond (UW); Madison, Hale (UW); farm land through woods 2 mi. east and 16 mi. south of Babcock, Wood Co., June 21, 1936, Hamerstrom (UW); prairies and opening, Milwaukee Co., July 1882, Hasse (NYB); in an uncared-for, blue-grass yard on northern bluff of Lake Wingra, Madison, July 8, 1907, Heddle 544 (UW); open, rocky woods on summit of slope of the west mound near Blue Mounds, Iowa Co., July 1, 1919, Heddle 2719 (UW); Winnebago Co., June, Kellerman (UW); rocky bank at Jim Falls, Chippewa Co., July 8, 1928, Kunz 8 (UW); Milwaukee, Lapham (UW); Camp Douglas, July 14, 1890, Mearns 224 (USN); Beloit, July 3, 1895, Olds 32 (UW); rocky banks of Chippewa River, north of Chippewa Falls, July 9, 1915, Rosendahl & Butters 3061 (UM); Poynette, July 8, 1886, Russell (UW); Madison, June 14, 1885, Smith (UW); Janesville, June 25, 1889, Skavlem (UW); Black River Falls, Jackson, June 27, 1922, Smith 6804 (UW); Tuffa Falls, Grant Co., July 31, 1922, Smith 7835 (UW); sandy soil near Buffalo Lake, Montello, Marquette Co., Sept. 18, 1929, Uhler & Warren (UW); Blue Mounds, June 19, 1886, Williamson (UW).

ILLINOIS: Riverside, June 8, 1871, Babcock (NYB); prairies, Holcomb, July 1, 1907, Beck 26908 (UW); prairies, Riverside, Cook Co., May 22, 1912, Braun (LB); old fields, Auburn, Aug. 1882, Bigler (GH); dry prairie, Akron Twp., Peoria Co., Chase 4143 (UW); dry prairie northwest of Princeville, June 30 and July 15, 1898, Chase 107 (NM); open field, Hinsdale, Cook Co., July 28, 1926, Churchill (MBG); Decatur, June 22, 1899, Clokey (MBG); prairie north of Prairie du Pont, July 2, 1878, Eggert (MBG); wet prairies, St. Clair Co., July 2, 1878, Eggert (GH); Bluff Lake, July 27, 1878, Eggert (MBG, UT); gravelly banks of Desplains River, Leyden Twp., Cook Co., June 17, 1905, Gates (USN); in prairie along roadside, Carthage, Hancock Co., Sept. 22, 1917, Gates 10861 (MBG); dry upland woods, Mohamet, June 1902, Gleason (GH); Ottawa, Huett (GH); Quercus Lake, Clinton Co., May 20, 1917, Ledman (MBG); prairie west of Melrose, June 15, 1894, Moffatt 645 (UW); prairies near Oquawka, Aug., Patterson (MBG); prairie, Bloomington, July 1886, Robinson (GH); rich prairie soil in sunny situations, Hendrix, Aug. 31, 1904, Robinson (GH); Bogota, July 6, 1926, Schallert (DU); Indian Creek region, vicinity of Concord, Morgan Co., Aug. 20, 1910, Steele (USN); fields, Palos Park, June 27, 1900, Umbach 11501 (UW); fields, Beach, July 3, 1909, Umbach 3717 (31510) (UW); Jubilee, 1888, Van Rensselaer (GH); Ringwood, Vasey 1182 (MBG); Chicago, Jan. 1888, Williamson (ANSP).

MINNESOTA: Rochester, June 22, 1904, Amslie (UM); Zumbrota, Goodhue Co., June 1893, Ballard (USN,GH,UM,UW); Winona, July 1912, Freiberg (MBG); Houston Co., Aug. 1912, Freiberg (MBG); sand prairie about 2 mi. north of Weaver, Wabasha Co., Sept. 21, 1930, Hotchkias & Jones 4159 (USN); Washington P.O., July 16, 1875, Leonard (UM); near Lake City, June 30, 1886, Manning (UM); White Rock, July 1881, Sandberg (UM); thickets, Hennepin, July 1890, Sandberg (UM); alluvial soil, Hennepin, July 1890, Sandberg (UM); White Bear Lake, July 16, 1888, Schuette (NYB); Minneapolis, July 7, 1884, Roberts

(UM); Spring Grove, June 8, 1902, Rosendahl 401 (UM).

Iowa: rich soil, Decatur Co., July 21, 1904, Anderson (MBG); Black Hawk Co., Burk (MBG); Vinton, Davis (UW); clay terrace, (Sect. 5T.95N.,R.3W.), Marquette, Clayton Co., Fassett 4365 (UW); high ground, Fayette Co., June 1893, Fink 578 (USN); common in fields, Decatur Co., June 7, 1896, Fitzpatrick & Fitzpatrick (MBG,GH); woods and pastures, Bentonsport, June 1920, Graves 1704 (MBG); Ames, Hitchcock (MBG); Ames, July 10, 1907, Jeffs (UO); Grinnell, Aug. 9, 1892, A. J. Jones (MBG); Grinnell, June 1877, M. E. Jones (USN, NYB); Des Moines, July 1895, Mosier (USN); open sunny hillsides, McGregor, Aug. 21, 1925, Pammel 676 (MBG,GH); Polk Co., July 6, 1927, Pammel (UM); common, Iowa drift sheet, Grundy Center, June 23, 1925, Pammel & Zimmerman 327 (GH); Fayette, Parker (UM).

MISSOURI: dry field, Leffingwell Ave., Kirkwood, July 11, 1936, Ammerman (MBG); Greene Co., July 29, 1893, Blankinship (GH); Jackson Co., July 6, 1892, Bush (MBG); common, Montier, May 15, 1894, Bush 87 (MBG); common, Little Blue, Jackson Co., May 24, 1896, Bush 311 (MBG); common in woods, Swan, June 6, 1899, Bush 74 (MBG); prairies, Converse, July 12, 1930, Bush 11854 (MBG); barrens, Eagle Rock, May 9, 1936, Bush 15387 (MBG); Munger, Iron Co., May 29, 1937, Chandler 2685 (MBG); roadsides, Whiteside, July 26, 1914, Davis 3773 (MBG); meadows near Oakwood, Ralls Co., July 16, 1915, Davis 609 (MBG); wet prairies, Whiteside, Sept. 17, 1916, Davis 1714 (MBG); roadside, Whiteside, Lincoln Co., Sept. 17, 1916, Davis (UT); waste fields,

Eolia, Pike Co., July 29, 1918, Davis 3151 (MBG); Springfield, July 31, 1892, Dewart 101 (MBG); Graniteville, May 27, 1916, Drushel (MBG); dry hills north of Keren, St. Francois Co., July 3, 1892, Eggert (MBG); prairies, St. Louis, Aug. 1845, Engelmann (MBG); meadows, St. Louis, June 29, 1860, Engelmann (MBG); Bridgeton, July 16, 1859, Fritchy (MBG); St. Louis, July 21, 1894, Glatfelter (MBG); banks of Stout Creek, the Shut-In, Iron Co., May 25, 1918, Greenman 3891 (MBG); Lake Killarney, Iron Co., May 8, 1925, Greenman 4786 (MBG); St. Francois River near Silver Mine, Madison Co., May 20, 1927, Greenman, Kobuski & Larsen (MBG); Allenton, July 17, 1884, Kellogg (MBG); Jerome, May 28, 1914, Kellogg 103 (MBG); Rolla, Phelps Co., May 20, 1928, Kellogg 1799 (MBG); along RR., Eolia, Pike Co., July 17, 1930, Kellogg 15217 (MBG); hillsides and RR. embankment 1 mi. south of Cedar Gap, Ozark Mtns., May 22-June 3, 1911, Lansing 2986 (USN,GH); sandy banks of St. Francois River above concrete bridge at Silver Mine, Iron Co., May 9, 1936, Larisey 1 & 2 (MBG); Allenton, May 10, 1896, Letterman (MBG); along RR. tracks on Highway 66, 3 mi. east of city limits of Cuba, Crawford Co., May 29, 1937, Lodewyks 368 (MBG); Peruque, July 20, 1919, McAtee 3013 (USN); common in low prairies and woods, Adams, Jackson Co., June 13, 1897, Mackensie (MBG,UM); frequent on moist prairies, Webb City, Jasper Co., July 10, 1909, Palmer 2464 (MBG); meadows and roadsides, black alluvial soil, Mississippi River bottoms 10 mi. south of Alexandria, Clark Co., June 26, 1933, Palmer & Steyermark 40629 (MBG); St. Louis, 1843, Riehl 421 (NYB); wet boggy ground, Buzzard Mtn., Iron Co., Aug. 1897, Russell (MBG); St. Louis Co., west of St. Louis, Sept. 7, 1905, Shannon 201 (MBG); open field, vicinity of Strafford, Greene Co., Aug. 27, 1912, Standley 9454 (USN); on low alluvial flood plain near Missouri River, 12 mi. northeast of St. Charles near Portage des Sioux, St. Charles Co., June 1, 1929, Steyermark 1353 (MBG); on sand bars of Little St. Francis River near Silver Mine, Madison Co., Nov. 9, 1930, Steyermark 1471 (MBG); rocky gravel of creek bed along Warm Branch of Spring River about 5 mi. north of Koshkonong, Oregon Co., Aug. 9, 1934, Steyermark 14379 (MBG,USN); low woods along Mud Creek, T.26N., R.7E., Sect.20, 2 mi. northwest of Rombauer, Butler Co., June 30, 1936, Steyermark 11293 (MBG); gravel bar along headwaters of Meramec River, T.33N.,R.4W., Sect.14, 2 mi. southeast of Max, Dent Co., Aug. 10, 1936, Steyermark 12825 (MBG); Reservoir, Joplin, Jasper Co., Oct. 7, 1897, Trelease 198 (MBG); Lake Killarney, Iron Co., May 8, 1925, Woodson 259 (MBG); Kirkwood, July 18, 1926, Woodson 740 (MBG).

ABRANSAS: along RR. 4 mi. northeast of Texarkana, Miller Co., May 20, 1938, Cutler (MBG); sandy prairies, Fayetteville, July, Harvey 16 (UM); prairies, northwest Arkansas, July, Harvey 16 (GH); Stuttgart, May 12, 1910, Howell 644 (USN); on roadside, 6 mi. west of Mount Ida on Highway 270, Montgomery Co., April 27, 1935, Lodewyks 176 (MBG); no definite locality, Pitcher (NYB); Benton Co., 1899, Plank (NYB); dry woods, Winslow, May 22, 1920, Wheeler

(NYB).

NEBRASKA: Saline Co., June 28, 1873, Aughey (UN); Ames, Story Co., June 1869, Bessey (UN); Wild Cat Cave near Fort Dodge, Webster Co., Sept. 24, 1904, Churchill 2054 (UN); rare, rich bottoms of Platte, June 7, Hayden (MBG); river bottoms, Nebraska City, May 31, 1889, Lownes (UN); scattered in low prairie near Ashland, Saunders Co., June 20, 1934, Morrison 1093 (MBG,UN); Lincoln, Lancaster Co., June 1906, Petersen (UN); Crabbe's Mill road, Lincoln,

Lancaster Co., June 27, 1887, Smith (UN); Salt Creek near Asylum, Lincoln, Lancaster Co., July 1887, Smith (UN); low prairie northeast of Havelock, July 14, 1928, Stoiger (UN); Lincoln, July 1888, Webber (MBG); prairies, Lincoln, Aug. 1889, Webber 344 (GH); roadside prairie, Peru, June 12, 1933, Winter 3 (USN).

KANSAS: near Randolph, July 1886, Cleburne (UN); Marshall Co., July 25. 1897, Clothier & Whitford (KA); Brown Co., July 29, 1897, Clothier & Whitford (KA); Doniphan Co., July 31, 1897, Clothier & Whitford (KA); Atchison Co., Aug. 2, 1897, Clothier & Whitford (KA); Linn Co., Aug. 9, 1897, Clothier & Whitford (KA); Bourbon Co., Aug. 11, 1897, Clothier & Whitford (KA); Crawford Co., Aug. 12, 1897, Clothier & Whitford (KA); Labette Co., Aug. 18, 1897, Clothier & Whitford (KA); Montgomery Co., Aug. 19, 1897, Clothier & Whitford (KA); Elk Co., Aug. 20 and 21, 1897, Clothier & Whitford (KA); Woodson Co., Aug. 29, 1897, Clothier & Whitford (KA); Coffey Co., Aug. 31, 1897, Clothier & Whitford (KA); prairie, Ellis Co., July 26, 1882, Deane (GH); prairie, Brown Co., Sept. 1925, Garner (KA); Allen Co., July 1890, Hitchcock (KA); Cherokee, Crawford Co., Aug. 1892, Hitchcock (KA); Eureka, Greenwood Co., Aug. 1892, Hitchcook (KA); Neosha Co., July 1896, Hitchcook (KA); Olathe, Johnson Co., July 7, 1887, Kellerman (MBG,KA); Columbus, Cherokee Co., July 13, 1887, Kellerman (KA); Burlingame, Osage Co., July 21, 1887, Kellerman (KA); dry prairie soil northeast of Keene, Wabaunsee Co., June 16, 1926, Maus 113 (KA); open prairie north of Auburn, Shawnee Co., July 7, 1927, Maus 848 (KA); near Belvue, Pottawatomie Co., July 29, 1896, Nagle (KA); wet soil, Pottawatomie Co., 1895, Norton 997 (MBG,GH,KA,NM); Wabaunsee Co., July 14, 1893, Carleton (KA); near St. Mary's, Pottawatomie Co., July 4, 1895, Norton & Clothier (KA); near St. Mary's in Jackson Co., July 4, 1895, Norton & Clothier (KA); Topeka, July 16, 1879, Popenoe (KA); schoolhouse hill and town reservoir, Pleasanton, Linn Co., June 19, 1929, Rydberg & Imler 65 (MBG).

OKLAHOMA: open woods north of Tecumseh, June 6, 1932, Barkley 232 (UO); without definite locality, coll. of 1877, Butler (MBG); common on prairies, Sapulpa, July 22, 1894, Bush 60 (MBG); open prairies, Wilburton, June 12, 1930, Clark (UO); roadside, high hill, Talihina, Le Flore Co., May 17, 1936, Demarce 12702 (NYB); black sticky soil on gentle slope 3 mi. north of Sapulpa, Creek Co., June 13, 1931, Fox 27 (UT); E. Latimer Co., May 5, 1935, Goodman 2557 (GH); along roadside east of Bokehite, Cleveland Co., June 19, 1919, Jeffs (UO); unbroken moist prairie, T.12N., R.20E., Sect. 20, Muskogee Co., May 22, 1927, Little 614 (UO); T.13N., R.18E., Sect. 24, Muskogee Co., June 12, 1927, Little 1251 (UO); Shannon Ranch Spring, McCurtain Co., T.38, R.24E., Sect. 28, June 7, 1930, Little 4 Olmsted (UO); prairie meadow 2 mi. west of Dawson, July 8, 1928, Myers 118 (UO); common on prairie, 3 mi. east of Adel, July 12, 1905, Van Vleet (UO); roadside 3 mi. east of Miami, Whaley 115 (UO).

TEXAS: along RR. 2 mi. east of Pine Island, Jefferson Co., April 20, 1936, Anderson & Hubricht (MBG); seen at edge of timbered rolling land, Orange, April 17, 1899, Bray 54 (UT); Jacksonville, Cherokee Co., April 30, 1903, Billmore Herb. (UM); near Turning Basin, Harris Co., April 14, 1934, Cory 8120 (GH); dry prairies north of Polk, Bowie Co., June 13, 1898, Eggert (MBG); Dalby, Mey 1896, Milligan (MBG); along RR. between Grand Saline and Silver Lake, May 22, 1900, Reverchon 1935 (MBG); low prairies, Silver Lake, May 22, 1900, Reverchon 1935 (USN); San Jacinto, Harris Co., July 4, 1923, Tharp 2316

(USN,UT); Clyde, July 3, 1927, Tharp 4739 (USN); Nacogdoches-Alto, June 15, 1931, Whitehouse (UT).

28. B. leucantha Torr. & Gray var. divaricata Larisey, var.  $nov.^{32}$ 

As the species except: less than 1 m. tall, darkening but apparently not blackening; stem slender, firm, scarcely ribbed, branches subdichotomous, divaricate, lateral ones drooping; petioles usually less than 5 mm. long, leaflets narrowly obovate to oblanceolate, mucronate, 2.5–3 cm. long; stipules setaceous, less than 3 mm. long, usually caducous; racemes slender, fewflowered, less than 2 dm. long; mature pod elliptic-oblongoid, firm, rugose, 2–2.5 cm. long, 0.8–1.5 cm. broad.

Distribution: prairies, southwestern Louisiana.

CITATION OF SPECIMENS:

LOUISIANA: prairie west of Crowley, Acadia Parish, July 16, 1935, Brown 5308 (LU); prairies, Opelousas, June, Langlois (UW,TYPE).

29. B. leucantha Torr. & Gray var. pauciflora Larisey, var. nov.25

As the species except: less than 1 m. tall; stem slender, firm, lightly ribbed, branches subdichotomous, spreading-ascending; petioles not exceeding 5 mm. in length, leaflets obovate to oblanceolate, retuse, not more than 4 cm. long; stipules lanceolate to setaceous, 3-4 mm. long, usually persistent; racemes slender, few-flowered, less than 2 dm. long; mature pod ovoid to subglobose, inequilateral, firm but extremely brittle, 1.5-2 cm. broad, 2 cm. long.

Distribution: prairies, south-central Louisiana.

<sup>&</sup>quot;Ab specie differt caulibus vix 1 m. altis postremo fuscis sed vix nigrescentibus, ramis gracilibus firmis vix striatis, ramulis subdichotomis divaricatis, lateralibus patulis; petiolis plerumque 5 mm. vel minus longis, foliolis anguste obovatis vel oblanceolatis 2.5-3.0 cm. longis, mucronatis, stipulis setaceis vix 3 mm. longis plerumque caducis; racemis gracilibus paucifloris vix 2 dm. longis; legumine maturo subcylindrico firmo rugoso 2.0-2.5 cm. longo 0.8-1.5 cm. lato.

<sup>&</sup>quot;Ab specie differt caulibus vix 1 m. altis gracilibus firmis leviter striatis, ramis subdichotomis patulo-ascendentibus; petiolis circiter 5 mm. longis, foliolis obovatis vel oblanceolatis retusis 4 cm. longis vel brevioribus, stipulis lanceolatis vel setaceis 3-4 mm. longis plerumque persistentibus; racemis gracilibus paucifloris vix 2 dm. longis; legumine ovoideo vel subgloboso inaequilaterale firmo sed fragilissimo 2 cm. longo, 1.5-2.0 cm. lato.

CITATION OF SPECIMENS:

LOUISIANA: common in prairies, Attakapas, "West La.," May 27, 1883, Langlois 10 (NYB, TYPE); common, Attakapas, June 3, 1890, Langlois 171 (UM).

30. B. psammophila Larisey, sp. nov.34

Plant usually more than 1 m. high, sometimes less, glabrous throughout; stem stout, fairly firm, heavily ribbed, blackening early, glaucous, simply branched, branches arising alternately from the primary stem, secondary and subsequent branches ascending, only rarely geniculate; leaves bright green, usually not blackening, petiolate, petioles 0.8-1.2 cm. long; leaflets broadly elliptic to obovate, occasionally oblanceolate, rarely cuneate, 4-6.5 cm. long, 2-3 cm. broad, delicate, finely reticulate, apex obtuse, rounded, or broadly acute, seldom retuse; stipules lanceolate, 0.8-1.2 cm. long, usually persistent, sometimes caducous; racemes terminal, erect, only rarely flexuous, compact, exceeding the foliage, 1-3.5 dm. long, flowers subverticillate; bracts lanceolate, 7-8 mm. long, usually caducous; pedicels 4-6 mm. long, slender; calyx black, glaucous, 0.9-1 cm. deep, upper lip entire, ovate, truncate, not usually emarginate, lobes of the lower lip deltoid to ovate, 3-3.5 mm. long; corolla white (?), standard 1.5-1.7 cm. high, 1.4-1.5 cm. wide, wings and keel 1.8-2.2 cm. long; pod black, glaucous, strongly reticulated, much inflated, oblong to subglobose, tapering gradually into a long stipe, 0.7-1.1 cm. in length, body

<sup>\*</sup>Herba 1 m. plus minusve alta, omnino glabra. Caules crassiusculi sat firmi valde striati cito nigrescentes glauci haud dichotomi, ramis alternatis ascendentibus haud vel raro geniculatis. Folia viridia raro nigrescentia, foliolis late ellipticis vel obovatis vel oblanceolatis 4.0-6.5 cm. longis, 2-3 cm. latis delicate membranaceis reticulato-venosis, apice obtusis vel rotundatis vel acutis raro retusis basi cuneatis, petiolis 0.8-1.2 cm. longis, stipulis lanceolatis 0.8-1.2 cm. longis fere persistentibus. Racemi terminales erecti raro flexuosi compacti folia superantes 1.0-3.5 dm. longi, bracteis lanceolatis 7-8 mm. longis saepe caducis, pedicellis 4-6 mm. longis graciliusculis subverticillatis. Calycis tubum 0.9-1.0 cm. longum nigrum pruinosum, labro superiore integro ovato truncato raro emarginato, labri inferiori lobis deltoideis vel ovatis 3.0-3.5 mm, longis, Corolla albida (†), vexillo 1.5-1.7 cm. longo, 1.4-1.5 cm. lato, alis carinaque 1.8-2.2 cm. longis. Legumen oblongoideum vel subglobosum 3.5-4.0 cm. longum, 2.5-3.0 cm. latum apice abrupte breviterque sed anguste rostratum basi in stipitem angustum 0.7-1.1 cm. longum gradatim productum nigrum pruinosum conspicue reticulatum valde inflatum tenue in rugas profundas corruens.

3.5-4 cm. long, 2.5-3 cm. broad, abruptly short- and slender-beaked, pericarp thin, collapsing into deep folds.

Distribution: sandy pine lands, central Georgia south to northern Florida.

CITATIONS OF SPECIMENS:

GEORGIA: rich woodland, Augusta, April 24—May 26, 1900, Cuthbert 180 (NYB); lowland woods between Montezuma and Oglethorpe, Macon Co., April 1, 1937, Oosting 74 (DU); 9 mi. southeast of Valdosta, Lowndes Co., Mar. 19, 1938, Pyron & MoVaugh 2158 (MBG); dry roadside embankment, Ochlockonee River 5 mi. west of Thomasville, Thomas Co., Mar. 20, 1938, Pyron & McVaugh 2206 (MBG); moist alluvial soil in woods 1 mi. north of River Junction, Florida (†), Decatur Co., Mar. 21, 1938, Pyron & McVaugh 2249 (MBG); sandy ridge 8 mi. from Valdosta, April 19, 1933, Totten (UNC).

FLORINA: moist soil, Westville, Holmes Co., April 18, 1899, Biltmore Herb. 1597 (NYB); pine woods, Tallahassee, April 8, 1902, Biltmore Herb. H/6046 (GH,TYPE, USN,NYB); high pineland 1 mi. south of Belleview, April 18, 1930, Blanton 6387 (MBG); no definite locality, Chapman (NYB); Chattahoochee, Chapman, Herb. No.792965 (MBG); Tologie Creek, Gadsden Co., 1889, Chapman (USN); open sandy woods, Alachua Co., March, Curtiss 697 (UN,ANSP); in dry sandy field, Greenville, Madison Co., May 1, 1930, Moldenke 1107 (MBG,NYB,DU); in pinelands 3 mi. west of Gainesville, Mar. 31, 1925, O'Neill 619 (MBG); Ha sandy prairies 5 mi. west of Tallahassee, Leon Co., April 11, 1931, Palmer 38521 (MBG); Leon Co., Mar. 22, 1904, Rehn (ANSP); "ad rivulos, prope Tallahassee," April 1843, Rugel (MBG,NYB); hammock along Suwannee River near Withlacoochee Bridge, April 21, 1924, Small, DeWinkeler, Mosier 11181 (NYB).

31. B. villosa (Walt.) Nutt. Gen. N. Am. Pl. 1: 281. 1818; Ell. Sketch Bot. S. Car. & Ga. 1: 468. 1821; DC. Prodr. 2: 100. 1825; Torr. & Gray, Fl. N. Am. 1: 384. 1840; Chapman, Fl. South. U. S., ed. 1, 111. 1860, ed. 2, 111. 1889, and ed. 3, 111. 1897; Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 266, fg. 2051. 1897, in part, and ed. 2, 2: 345, fig. 2455. 1913, in part; Small, Fl. Southeast. U. S., ed. 1, 599. 1903, and ed. 2, 599. 1913; Gray, New Man. Bot., ed. 7, 506. 1908, in part; Small, Man. Southeast. Fl. 677. 1933.

Sophora villosa Walt. Fl. Car. 134. 1788.

Podalyria villosa Michx. Fl. Bor. Am. 1: 264. 1803; Pursh, Fl. Am. Sept. 1: 307. 1814, and ed. 2, 1816.

Lasinia cinerea Raf. New Fl. N. Am. 2: 50. 1836 [1837]. Lasinia fulva Raf. New Fl. N. Am. 2: 49. 1836 [1837].

Plant less than 1 m. high, tawny-pubescent throughout, villous when young, blackening; stem stout, heavily ribbed,

slightly twisted, with spreading-drooping, strongly geniculate branches; leaves short-petiolate, petioles stout, channelled. usually less than 5 mm. long; leaflets coriaceous, strongly reticulate, lustrous and glabrous above, elliptic to rhombic-elliptic. or individually oblanceolate or obovate, cuneate, tapering gradually toward base into a slender petiole, apex obtuse or broadly acute, rarely notched, usually apiculate, 6-9 cm. long. 2-3.5 cm. broad; stipules ovate to lanceolate, firm, reticulate. 5-10 mm. long, usually persistent, sometimes caducous; racemes terminal, erect or flexuous, 2-4 dm. long; floral bracts lanceolate, 7-9 mm. long, usually caducous, occasionally persistent; pedicels stout, 5-7 mm. long; calyx-tube 8-10 mm. deep, strongly reticulate, upper lip broadly truncate, slightly depressed, or occasionally emarginate, lobes of the lower lip deltoid to ovate, 3-4 mm. long; corolla yellow, standard 1.7-1.9 cm. high, 2 cm. wide, wings and keel 2-2.4 cm. long; ovary densely villous, mature pod somewhat ligneous, inflated, lustrous, sparsely pubescent, ellipsoid, 2.5-3 cm. long, 1.3 cm. broad, narrowing gradually into a slender beak.

Distribution: sandy woods and hills, coastal plain of Virginia, south to South Carolina.

CITATION OF SPECIMENS:

VIRGINIA: Franklin, coll. of 1867, Camby (GH).

NORTH CAROLINA: sandy woods, Wilmington, May 9, 1928, Anderson (MBG); sandy soil, White Hall, Bladen Co., June 19, 1897, Biltmore Herb. 1262 (USN, NYB, UM); sandy soil, Fayetteville, June 12, 1902, Biltmore Herb. 1262d (NYB); dry sandy soil, Leland, Brunswick Co., May 10, 1931, Blomquist 3895 (DU); in sand barrens near Raleigh, Wake Co., May 19, 1930, Bright 2594 (CD); near Wilmington, May 1867, Canby (NYB, ANSP, FM); Weldon, July 1, 1878, ex Herb. Canby (GH,FM); no definite locality, Herb. Chapman (NYB); sand hills "across Lake," May 22, 1909, Coker (NYB); no definite locality, Curtis (MBG, NYB, WU); Wilmington, Curtis (GH); open sandy and peaty barrens about 4 mi. east of Bolivia, Brunswick Co., April 16, 1933, Fogg 5490 (GH); on pocasin-savanna, Chowan Terrace at Angola Bay, Wilmington, New Hanover Co., April 16, 1938, Moldenke (Friend) 10432 (NYB); Southern Pines, May 5, 1927, Harriott (ANSP); Statesville, Hyams (MBG,FM,UM); Bingham, June 1877, Hyams (USN); Burgaw, May 1880, Hyams (NYB,KA); Wilmington, Aug. 1880, Hyams (OU); Magnolia, Duplin Co., April 30, 1933, Mathews (DU); dry sandy pine woods west of Leland, Brunswick Co., May 15, 1930, Moldenke 1236 (MBG,USN, NYB,DU); no definite locality, Aug. 2, Nuttall (ANSP); sandy area near White Lake, Bladen Co., May 12, 1934, Oosting 34111 (DU); sandy turkey oak area, Sampson Co., May 12, 1934, Oceting 34145 (DU); dry sandy soil, open scrub land 1½ mi. southeast of Kinston, Lenoir Co., July 9, 1922, Randolph & Randolph 565 (GH); low pine land, Nakina, May 1, 1929, Schallert (DU); Burgaw, July 1879, Spence (OU); dry sandy bank 3 mi. west of Sims, Wilson Co., June 25, 1927, Wiegand & Manning 1493 (GH); sandy field 1 mi. south of Hoffman, Richmond Co., July 1, 1927, Wiegand & Manning 1494 (GH); Hamlet, May 20, 1895, Williamson (NYB,ANSP).

SOUTH CAROLINA: Poston, April 21, 1924, Benke 3800-1 (FM); Camden, May 8, 1857, Gibbes (NYB); South Pines in eastern S. Car., 1889, McCarthy (USN); South Pines, Aug. 1889, McCarthy 9920 (WU); sand hills, Highland Farms, Hartsville, July 17, 1920, Norton (USN); Cherow, Wallace (CM).

32. B. tinctoria (L.) Vent. Dec. Gen. Nov. 9. 1808; R. Br. in Ait. Hort. Kew, ed. 2, 3: 6. 1811; Ell. Sketch Bot. S. Car. & Ga. 1: 467. 1821; DC. Prodr. 2: 100. 1825; Torr. & Gray, Fl. N. Am. 1: 386. 1840; Chapman, Fl. South. U. S., ed. 1, 111. 1860, ed. 2, 111. 1889, and ed. 3, 121. 1897; Britton & Brown, Illust. Fl. North. U. S., ed. 1, 2: 266, fig. 2050. 1897, in part, and ed. 2, 2: 345, fig. 2454. 1913, in part; Small, Fl. Southeast. U. S., ed. 1, 598. 1903, and ed. 2, 598. 1913; Gray, New Man. Bot., ed. 7, 506. 1908; Rydb. Fl. Prairies & Plains Central N. Am. 455. 1932; Small, Man. Southeast. Fl. 676. 1933.

B. Gibbesii Small, Fl. Southeast. U. S., ed. 1, 600, 1331. 1903, and ed. 2, 599. 1913; Small, Man. Southeast. Fl. 676. 1933.

B. tinctoria (L.) Vent. var. Gibbesii (Small) Fern. in Rhodora 38: 424. 1936.

Sophora tinctoria L. Sp. Pl. 1: 373. 1753; Walt. Fl. Car. 134. 1788.

Podalyria tinctoria Willd. in L. Sp. Pl., ed. 4, 2: 503. 1799; Michx. Fl. Bor. Am. 1: 265. 1803; Curt. Bot. Mag. 27: pl. 1099. 1808; Pursh, Fl. Am. Sept. 1: 308. 1814, and ed. 2, 308. 1816.

Plant 1 m. or less high, virtually glabrous, occasionally slightly pubescent in parts, blackening in drying; stem slender, firm, widely branched, branches arising alternately from a single primary stem, ascending; leaves subsessile to short-petiolate, petioles 2-3 mm. long, leaflets obovate, strongly cuneate, 1-1.5 cm. long, 0.6-1 cm. broad, rounded or obtuse at the apex, slightly retuse, lower surface delicately nerved; stipules minute, setaceous, deciduous; racemes numerous, terminating the branches, 0.7-1 dm. long; floral bracts lanceo-

late-setaceous, minute, deciduous; pedicels 4–5 mm. long; calyx-tube 3–4 mm. long, upper lip entire or slightly emarginate, lobes of the lower lip deltoid-acuminate, 1–1.5 mm. long; corolla yellow, standard 1 cm. high, 0.8–1 cm. broad, wings and keel 1.2–1.3 cm. long; mature pods subglobose to ovoid, strongly rounded at base and summit, contracted along the sutures, 0.7–0.9 cm. long, 0.6–0.8 cm. broad, black, glaucous, rugose to reticulate, slender-beaked, long-stipitate, stipe 3 times the length of the calyx.

Distribution: sandy ground and dry open woods, Massachusetts to Minnesota, southeast to South Carolina and Georgia.

CITATION OF SPECIMENS:

MASSACHUSETTS: Nantucket, July 1887, Allen (UW); near Boston, coll. of 1816, Boott (USN); Martha's Vineyard, July 16 & Aug. 18, 1892, Curtiss (UM); common near lagoon, Martha's Vineyard, Drushel 6267 (MBG); Beverly, Sept. 10, 1856, Engelmann (MBG); sterile hillside, Lunenburg, Worcester Co., July 12, 1930, Fassett 10610 (UW); Reading, July 24, 1882, Manning (NYB); along Edgarton Road, West Tisbury, Martha's Vineyard, Sept. 5, 1916, Seymour 1237 (NYB); Nantucket, July 23, 1890, Wislizenus 922 (MBG).

CONNECTICUT: Bates' Farm, North Haven, Oct. 4, 1913, Bates 5847 (UN).

NEW YORK: prairie, Hempstead Plains near Central Park, Cold Spring Harbor,

Long Island, Aug. 6, 1934, Cain 7433 (IU); Babylon, southern Long Island, July 4-5, 1898, Clute 134 (NYB); Long Island, Aug. 13, 1891, Schrenk (MBG).

NEW JERSEY: dry open sandy places along Maurice River south of Millville, Cumberland Co., July 1, 1926, Adams 354 (CD); vacant lot near Roosevelt School, Westfield, July 18, 1927, Drushel 3308 (MBG); Spotswood, July 27, 1930, Drushel 6957 (MBG); pine barrens, Sept. 16, 1879, Engelmann (MBG); Cape May Co., Aug. 5, 1931, Keefe (UW); sandy soil, East Orange, July 8, 1914, Lighthigh (MBG); dry sandy pine woods, Atsion, Burlington Co., June 22, 1922, Long 26855 (GH); sand-hills, South Amboy, Middlesex Co., July 30, 1905, Mackensie 1558 (MBG); Peapack, Perry (MBG); woods, Elmer, Salem Co., July 4, 1874, Redfield 1186 (MBG).

PENNSYLVANIA: Tuscarora, Aug. 1824, ex Bernhardi Herb. (MBG); York Co., Sept. 1899, ex Glatfelter Herb. (MBG); Philadelphia, 1843, Lea (MBG).

DELAWARE: Sussex Co., July 13, 1878, Canby (GH).

MARYLAND: woods and fields, Mtn. Lake Park, July 25, 1906, Braun (LB); Black Ridge, near Swanton, Garrett Co., June 27, 1931, Core (NYB).

DISTRICT OF COLUMBIA: sandy soil, Brookland, Aug. 28, 1908, Holm (MBG); north of Brookland, Aug. 7, 1911, Nieuwland (MBG); dry hillsides near Rock

Creek Park, Washington, Sept. 17, 1930, Steyermark 993 (MBG).

VIRGINIA: dry open woods, Clarendon, July 6 & Aug. 12, 1929, Blake 10857 (UT); Norfolk Co., June 27, 1872, Curtiss (MBG); clay field near Lynnhaven, Princess Anne Co., June 17, 1935, Fernald, Griscom & Long 4658 (GH); dry clearing bordering pine woods south of Kendall Grove, Northampton Co., Oct. 13, 15, 1935, Fernald, Long, Fogg 5319 (GH); argillaceous and siliceous boggy depres-

sion north of Gary Church, Prince George Co., June 25, 1936, Fernald, Long & Smart 5804 (MBG,GH); on Round Top Mtn., west of Seven Mile Ford, Smyth Co., July 2, 1892, Small (MBG).

NORTH CAROLINA: Salem, July 1896, ex Herb. Ashe (MBG); dry woodland, Biltmore, Aug. 16, 1897, ex Biltmore Herb. 137a (NYB); dry woods, Waynesville, Haywood Co., July 18, 1930, Blomquist 3894 (DU); dry open ground, Durham Co., Aug. 5, 1932, Blomquist 3893 (DU); Weldon, July 1, 1878, Canby (GH); old field, dry soil, near Bear Creek, Chatham Co., June 14, 1935, Correll 691 (GH); no definite locality, coll. of 1848, Curtis mis. (MBG); open pastures, Mt. Mitchell Station, McDowell Co., July 27, 1917, Davis 7805 (MBG); dry woods, Flat Rock, Henderson Co., June 26, 1920, Davis (UM); Saluda, Polk Co., June 29, 1920, Davis (MBG); Mt. Mitchell, Aug. 19, 1925, Kraus (UW); east of Durham, Wake Co., July 1932, Lynn (DU); in dry soil, woods on old town road north of Winston, May 12, 1911, Schaller: 859 (DU); Grandfather Mtn. Forest, Aug. 12, 1890, Sudworth 131 (USN); mtns. of western N. Car., coll. of 1926, Trentham (DU); sandy bank by roadside 4 mi. west of Raleigh, Wake Co., coll. of 1927, Wiegand & Manning 1491 (GH).

SOUTH CAROLINA: Society Hill, July 1, 1878, Canby (GH); sandy woods north of Graniteville, Aiken Co., Aug. 6, 1898, Eggert (MBG); sandy ground north of King Station, Aiken Co., May 24, 1899, Eggert (MBG); no definite locality, ex Herb. Ell. (CM); Caesar's Head, Aug. 7, 1912, Gailliard & Bragg 3672 & 3673 (CM); Abbeville, Hexamer & Maier (GH); no definite locality, coll. of 1834, Gibbes (NYB,COTYPE of B. Gibbesii Small); Charleston, July 10, 1861, Manigault (NYB,TYPE of B. Gibbesii Small); Seneca, June 1888, McCarthy (USN); Steadman's Pond, vicinity of Batesburg, Lexington Co., May 30, 1913, McGregor 162 (USN); dry open woods near Clementia Tourist Camp, 14 mi. south of Charleston, Charleston Co., May 14, 1930, Moldenke 1220 (MBG,DU); Aiken, Aug., Ravenel (NYB); Santee Canal, Ravenel (CM); Aiken, June 1869, Ravenel (USN); Cooper River, May 1848, Wallace (CM).

GEORGIA: sandy ground north of Tucker, Richmond Co., May 22, 1899, Eggert (MBG); dry pine woods near Belair, Richmond Co., June 10, 1902, Harper 1315 (USN,GH); Tallulah Falls, June 14, 1911, Reade E3390 (UG); open woodland, Athens Y Camp, Tallulah Falls, July 14, 1929, Reade E3371 (UG); Blue Ridge Mtns., Fannin Co., July 22, 1909, Smith 2465 & 2544 (UW).

FLORIDA: "in pinetis, prope Quincy," May 1843, Rugel (MBG).

OHIO: Parma, July 1897, Ashcroft (MBG,UM); Sheffield, Lorain Co., Aug. 12, 1895, Dick (USN,OU); Turkey Creek road near base of Divide, Sciota Co., July 16, 1927, Harper (OU); Oak Harbor, Aug. 1927, Moore (UO).

WEST VIRGINIA: Rhododendron Nursery near White Sulphur Springs, Greenbriar Co., July 24, 1930, Berkley 1240 (MBG); near Bucklin, Upshur Co., July 16, 1894, Pollock (MBG,KA).

Indiana: Gary, Lake Co., July 5, 1930, Standley 57413 (CD); on sandy road, 2-3 mi. northeast of Tefft, Jasper Co., July 10, 1924, Welch 5311 (IU).

MINNESOTA: Lake City, July 24, 1882, Sandberg (UM).

33. B. tinctoria (L.) Vent. var. crebra Fern. in Rhodora 39: 415. 1937.

As the species except: plant larger and coarser in general

habit; leaflets 2-4 times as large, 1.5-4 cm. long, 0.8-1.8 cm. broad; flowers 1.3-1.6 cm. long; pods ovoid to elliptic, attenuate at base and apex, 0.8-1.5 cm. long.

Hybridizes with B. alba in Virginia, and with B. leucantha in Indians.

Distribution: dry woods, Maine to Minnesota, south to North Carolina and Tennessee.

CITATION OF SPECIMENS:

Maine: dry woods, mixed hardwood, Alfred, Shaker Hill, York Co., July 23, 1936, Steinmetz (GH).

VERMONT: shade of oaks, Pownal, Bennington Co., Aug. 13, 1902, Blanchard (GH); Pownal, rare in S. Vt., July 29, 1898, Eggleston & Churchill (MBG).

Massachusetts: Wellesley, Sept. 4, 1915, Anderson 2401 (IU); Springfield, Hampden Co., July 27, 1903, Burnham (GH); scarce, moist shady road, Sheffield, Berkshire Co., Aug. 8, 1920, Churchill (MBG,GH); New Bedford, Greene (UW); near Hyannisport, Cape Cod, Sept. 5, 1898, Greenman 458 (MBG,GH); Milton, Aug. 6, 1899, Greenman 2279 (MBG); Canton, Aug. 8, 1887, Kennedy (GH); Springfield, July 10, 1928, Lyman (UW); Newton, Oct 5, 1889, Pound (UN); Springfield, July 5, 1895, Rich (UN); dry woods, Lincoln, Aug. 15, 1896, Rich (GH); along Edgarton Road west of Tisbury, Martha's Vineyard, Sept. 5, 1916, Seymour (GH); open spots in deciduous woods, Wilbraham Mt., Wilbraham, Hampden Co., July 26, 1927, Seymour 679 (GH, Type, MBG); Hyde Park, July 1891, Tower (NM).

RHODE ISLAND: fields east of cut swamp, Providence, Aug. 11, 1893, Collins (GH); Providence, Olney (GH).

CONNECTICUT: New Haven, July 7, 1879, Allen (GH); common, sandy woods, Southington, Sept. 10, 1897, Bissell 514(42) (MBG); dry field, Stratford, July 22, 1898, Eames 1 (GH).

NEW YORK: dry thickets south of sand dunes by Lake Ontario, Selkirk, Oswego Co., Aug. 23, 1922, Fernald, Wiegand, Eames 14356 (GH); New Dorp, Long Island, Sept. 30, 1894, Kearney (OU); Shrub Oak, July 31, 1887, Martens (GH); Canarsie, Brooklyn, July 7, 1936, Monachino 84 (GH,UT).

NEW JERSEY: sandy roadside bank, margins of damp woods 0.75 mi. northwest of Shiloh, Cumberland Co., July 24, 1927, Adams 863 (MBG); Califon, Hunterdon Co., July 12, 1902, Fisher (UW); dry pine woods, Cape May Point, July 8, 1922, Fogg 162 (GH); in sand along ocean front, Cape May, Aug. 17, 1917, Gershey 356 (GH); Orange, Aug. 5, 1914, Lighthipe (UT); vicinity of Clifton, Passaic Co., July 19, 1891, Nash (KA); Franklin, July 1879, Rusby 692 (UM); Summit, Aug. 3, 1907, Rydberg 8000 (NYB); in dry ground, Pleasantville, July 10, 1923, Tidestrom 11399 (GH).

PENNSYLVANIA: sandy ground, Grove City, Mercer Co., July 18, 1900, Barbour 4 (KA); Mount Gretna, July 19, 1889, Fritchy (MBG); Lancaster Co., June 8, 1883, Galen (MBG); Loganville, Oct. 1, 1892, ex Herb. Glatfelter (MBG); Philadelphia, 1889, Greenman 970 (GH); no definite locality, 1844, Lea (MBG); woods, lower Merson, July 2, 1871, Redfield (MBG); Smithville Swamp, Lancaster Co., July 23, 1889, Small (MBG); Lancaster, July 8, 1874, Stevens (MBG).

DELAWARE: dry woods, Greenbank, July 24, 1883, Cummins (MBG,GH); in woods west of Wilmington, Aug. 1, 1923, Tidestrom 11514 (GH).

MARYLAND: Elk Neck, Cecil Co., June 18, 1923, Abbott (GH); Deep Creek Lake region, Garrett Co., Aug. 5, 1937, Bright 15565 (UT); among pines, Armiger, July 8, 1924, Tidestrom 12254 (GH).

DISTRICT OF COLUMBIA: woods, July 4, 1890, ex Herb. Blanchard (UM); Washington, July 16, 1891, Blanchard (MBG); woods near Eckington, July 15, 1893, Boettcher 187 (MBG); coll. of 1881, Canby (UN); rocky woods south of Chevy Chase, July 18, 1904, Chase 2492 (UM); frequent in woods near Washington, July 1, 1880, Holm (GH); sand hills near Terra Cotta, July 1910, Holm (MBG); in sandy soil, Brookland, May 1911, Holm (MBG); near West Gate, Soldiers' Home, June 25, 1897, Kearney (OU); July 7, 1843, McCarthy & Schuette (UM); dry thickets and woods, July 25, 1896, Steele (MBG, DU, UM); Oxen Hill, June 16, 1895, Topping (UM); coll. of 1875, Vasey (OU).

VIRGINIA: dry soil, Clifton Forge, June 29, 1903, Biltmore Herb. 137b (OU); Arlington, June 21, 1890, Blanchard (MBG); dry mixed woods, Little Neck, Princess Anne Co., Aug. 8 & 9, Fernald & Long 3972 (GH); dry clearing bordering pine woods south of Kendall Grove, Northampton Co., Oct. 13-14, 1935, Fernald, Long & Fogg (GH); dry pasture, Elkins, Randolph Co., Sept. 22, 1904, Greenman 185 (GH); in open stand of Pinus Taeda 3.5 mi. north of Accomac, Accomac Co., June 29, 1928, Jones (MBG); Round Top Mtn., west of Seven Mile Ford, Smyth Co., July 2, 1892, Small (NYB); vicinity of Stony Mtn., near Luray, Aug. 20, 1901, Steele & Steele 42 (UM).

NORTH CAROLINA: rocky woods, Balsam, July 19, 1911, Braun (LB); face of mountain above Tuckaseegee Falls, Jackson Co., July 4, 1934, Clabaugh 56 (DU); Flat Rock, Henderson Co., June 26, 1920, Davis (MBG,UT); Saluda, Polk Co., June 27, 28, 29, 1920, Davis (MBG,UM,UT); Saluda, July 30, 1912, Davis 1493 (MBG); Asheville, June 1925, Kraus (UW); Sapphire, July 20, 1901, Magee (GH); open woods 9 mi. west of Hayesville, Trout Cove Creek, Clay Co., July 8, 1934, Oosting 34584 (DU); dry shaley slope, Nantahala Gorge, road to Robbins-ville, July 8, 1934, Oosting 34631 (DU); dry sterile soil, edge of woods, 2 mi. southeast of Granite Falls, Caldwell Co., July 30, 1922, Randolph & Randolph 1067 (GH).

ONTARIO: sandy swamps near Leamington, western Ontario, June 1, 1882, Macoun 564 (NYB); sandy woods, Windsor, Sept. 16, 1884, Macoun (GH); Sandwich, July 25, 1901, Macoun 34197 (GH).

OHIO: common in copses near Toledo, Lucas Co., June 1898, Burglehaus (OU); abundant locally, Stanhope Gorge, Williamsfield Twp., Ashtabula Co., Sept. 4, 1928, Hicks (OU); Niles, Trumbull Co., July 31, 1891, Ingraham (OU); Bowling Green, Wood Co., Sept. 2, 1901, Kellerman (OU); Collmer, Cuyahoga Co., July 18, 1895. Stair (OU); Neopolis, Lucas Co., Aug. 16, 1897, Schultz (OU); Brady's Lake, Portage Co., July 12, 1902, Webb 534 (GH); Painesville, Lake Co., July 1892, Warner (OU).

WEST VIRGINIA: open woods, Buckhannon, Upshur Co., July 11, 1890, Millspaugh 399 (NYB); Upshur Co., July 9, 1896, Pollock (MBG,KA).

MICHIGAN: north of Wayne, Wayne Co., Aug. 11, 1929, Brown 2744 (UW); dry soil, Jackson Co., July 17, 1894, Camp & Camp 648 (UM,UW); St. Clair-Algonac, St. Clair Co., July 11, 1894, Dodge (UT); near Port Huron, St. Clair Co., July 27, 1894, Dodge 6468 (UM,UW); Arboretum, Ann Arbor, Washtenaw Co., Aug. 14, 1915, La Rue (KA).

INDIATA: prairie 0.5 mi. north of Clear Lake, Steuben Co., July 24, 1904, Deam (MBG,CD); flat woods on southeast border of Bass Lake, Starke Co., Aug. 20, 1915, Deam 17,971 (GH,UM,CD); in clearing on high gravelly bank on east side of tamarack bog 5 mi. east of La Grange, La Grange Co., July 12, 1923, Deam 39,066 (CD); moist roadside 1 mi. west and 3 mi. south of Tefft, Jasper Co., July 20, 1930, Deam 49,180 (CD); low open place in H. H. Peele woods 1 mi. southwest of Knox, Starke Co., June 24, 1938, Deam 58,993 (MBG); open sandy low woods 3 mi. south and 1 mi. west of Knox, Starke Co., June 24, 1938, Deam 58,996 (MBG); sandy bank of freshly dug ditch 5 mi. north of Medaryville, Pulaski Co., Sept. 5, 1931, Potager 2069 (IU).

KENTUCKY: Pine Mtn., Harlan Co., Aug. 1893, Kearney 76 (GH,NYB,UM). TENNESSEE: dry woods, Cades Cove Mtn., July 29, 1897, Ruth 306 (GH). MINNESOTA: Madison, July 1886, ex Herb. L. Braun (LB).

# 34. B. tinctoria (L.) Vent. var. projecta Fern. in Rhodora 39: 415. 1937.

As var. crebra Fern. except: leaves oblanceolate; racemes 3-4.5 dm. long.

Distribution: mountains, Pennsylvania to Virginia.

CITATION OF SPECIMENS:

PENNSYLVANIA: laurel woods, hill top, Warrior's Mark, Huntingdon Co., June 27, 1924, Wiegand (GH).

VIRGINIA: common in opening southwest of Skyland, Shenandoah Nat. Park, May 31, 1936, Camp 1281 (NYB); abundant, open slopes, rocky spurs and coves between Pass Mtn. and Oventop Mtn., Shenandoah Nat. Park, June 3, 1936, Camp 1340 (NYB); dry woods, Hot Springs, Bath Co., July 1, 1917, Hunnewell 4694 (GH,TYPE).

### 35. × B. Deamii Larisey, hyb. nov.35

#### = B. tinctoria var. crebra × leucantha.

Plant at least 1 m. high, usually glabrous throughout, occasionally sparsely pubescent in parts, blackening in drying; stem somewhat stout, relatively firm, ribbed, glaucous, erect or geniculate, widely but simply branched, branches ascending; upper leaves subsessile to short-petiolate, petioles of the lower leaves 5–8 mm. long; leaflets broadly obovate, rarely oblanceolate, cuneate, apex rounded, obtuse, finely apiculate or slightly retuse, 2.8–4.5 cm. long, 0.8–2.5 cm. broad, delicate, lightly reticulate, lower surface frequently pubescent toward the base, especially along the midvein; stipules lanceolate-setaceous,

<sup>&</sup>lt;sup>38</sup>Inter tinctoriam var. crebram et leucantham media; herba usque ad 1 m. alta; foliolae late obovatae raro oblanceolatae cuneatae apice rotundae vel obtusae anguste apiculatae vel paulo retusae; corolla fulva, vexillo purpureo-maculato.

less than 5 mm. long, usually caducous; terminal racemes about 3 dm. long, lateral 1–2 dm. long, both loose, erect or somewhat flexuous; floral bracts ovate-lanceolate, 5–6 mm. long, usually caducous; pedicels slender, 4–7 mm. long; calyx-tube 6–7 mm. deep, upper lip entire, truncate, or slightly emarginate, lobes of the lower lip deltoid-ovate, 1–1.5 mm. long; corolla yellow, standard splotched with purple, 1.5–1.7 cm. high, 1–1.2 cm. broad, wings and keel 1.7–1.9 mm. long; mature pod oblongoid to subcylindrical, 1.7–2 cm. long, 0.7–0.9 cm. broad, very firm, rugose, black, pruinose, long-stipitate, short-beaked.

This hybrid is named in honor of Mr. Charles C. Deam in appreciation of his efforts to obtain material of the three entities involved; through his interest in the problem much information not otherwise available has aided in the study of

this complex.

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Distribution: sandy oak woods, northwestern Indiana.

CITATION OF SPECIMENS:

INDIANA: rare in black sandy soil along roadside through pin- and black-oak land about 3 mi. northwest of Knox, Starke Co., June 9, 1923, Deam 38,811 (ANSP); in an open, sandy, low wood at southeast corner of crossroads 3 mi. north and 1 mi. west of Knox, Starke Co., June 24, 1938, Deam 58,994, 58,995, (MBG,TYPE); open woods at crossroads 3 mi. north, 1 mi. west of Knox, Starke Co., June 24, 1938, Deam (MBG); H. H. Peele woods 1 mi. southwest of Knox, Starke Co., June 24, 1938, Deam (MBG); open pasture, Knox, Starke Co., Sept. 8, 1935, Deam & Fassett 17411 (UW).

# 36. × B. pinetorum Larisey, hyb. nov. 36

= B. tinctoria var. crebra × alba.

Plant 1 m. or less, sparsely appressed-pubescent to glabrate throughout, darkening slightly in drying; stem slender, delicate, ribbed, usually glabrous, occasionally finely pubescent, ciliate at the nodes, somewhat glaucous; branches arising alternately from the primary stem, ascending; leaves slender-petiolate, petioles 4–7 mm. long, usually more densely pubescent than other parts; leaflets obovate to oblanceolate, cuneate, apex rounded to obtuse, occasionally finely apiculate, rarely retuse, 2–3 cm. long, 0.8–1.3 cm. broad, delicate, finely reticu-

<sup>&</sup>lt;sup>36</sup>Inter tinctoriam var. crebram et albam media; herba 1 m. alta vel minor; foliolae obovatae vel oblanceolatae cuneatae apice rotundatae vel obtusae interdum anguste apiculatae raro retusae; corolla gilva vel flava.

late, sparsely pubescent on lower surface or occasionally ciliate only on the mid-vein; stipules lanceolate-setaceous, less than 5 mm. long, usually persistent; terminal raceme 3–4 dm. long, lateral 1–2 dm. long, both loose, erect, only rarely flexuous; floral bracts lanceolate, 3–4 mm. long, usually caducous; pedicels slender, 5–7 mm. long; calyx-tube 4–5 mm. deep, upper lip usually entire, ovate, occasionally slightly emarginate, lobes of the lower lip deltoid-lanceolate, 2–2.5 mm. long; corolla deep cream to yellow, standard auriculate or entire, 1.1–1.3 cm. high, 0.9–1 cm. broad, wings and keel 1.2–1.5 cm. long; mature pod ovoid to oblongoid, occasionally subcylindrical, inflated, 1.3–1.7 cm. long, 0.5–0.7 cm. wide, thin but firm, strongly reticulate, purplish-brown, glaucous, tapering gradually into a long stipe and short, slender beak, beak recurved.

Distribution: pinelands, eastern Virginia.

CITATION OF SPECIMENS:

VIRGINIA: in open stand of *Pinus Taeda* 3½ mi. north of Accomac, Accomac Co., June 29, 1928, *Jones* (MBG,TYPE); in dry sandy field north of Accomac, Accomac Co., May 19, 1930, *Moldenke 1254* (MBG,USN,NYB,UP); in woods on east side of Route 13, under *Pinus Taeda*, 4 mi. north of Accomac, Accomac Co., June 4, 1935 *Tatnall 2656* (GH); sandy soil in dry open woods, mostly pine, 4 mi. north of Accomac, Accomac Co., June 29, 1928, *True* (UP).

37. B. Serenae M. A. Curtis in Am. Jour. Sci. II, 2: 406. 1849; Chapman, Fl. South. U. S., ed. 1, 112. 1860, ed. 2, 112. 1889, and ed. 3, 122. 1897; Small, Fl. Southeast. U. S., ed. 1, 600. 1903, and ed. 2, 600. 1913; Small, Man. Southeast. Fl. 677. 1933.

Plant 1 m. or less high, virtually glabrous, occasionally sparsely pubescent in parts, darkening but not usually blackening in drying; stem slender, firm, glabrous, simply but diffusely branched, secondary branches geniculate, subdichotomous, divaricate; leaves petiolate, petioles slender, 3–5 mm. long; leaflets usually oblanceolate, cuneate, occasionally elliptic, acute to rounded at the apex, finely mucronate, rarely retuse, 1.5–3 cm. long, 0.5–1 cm. broad, usually glabrous, lower surface occasionally finely pubescent along the midvein, margins revolute; stipules minute, setaceous, deciduous; terminal racemes 1–3 dm. long, lateral ones less than 1 dm. long, flowers subverticillate, ascending; floral bracts lanceolate-setaceous,

less than 3 mm. long, caducous; pedicels slender, 3–5 mm. long; calyx-tube 4–5 mm. deep, upper lip entire, ovate or truncate, rarely slightly retuse, lobes of the lower lip deltoid, 1–1.5 mm. long; corolla bright yellow, standard 1–1.2 cm. high, 1–1.2 cm. broad, wings and keel 1.2–1.4 cm. long; mature pod oblongoid, subcylindric, inflated, 1.5–3.5 cm. long, 0.6–0.8 cm. wide, thin but firm, rugose to strongly reticulate, ferruginous to purplishbrown, short-stipitate, short- and slender-beaked, ascending.

Distribution: pine barrens, South Carolina to Florida.

CITATION OF SPECIMENS:

SOUTH CAROLINA: Society Hill, July 3, 1878, ex Herb. Canby (MBG,USN,GH, NYB,FM); no definite locality, Curtis 1848 (MBG,ISO-TYPE); Society Hill, Curtis (NYB); "in loc. humidis, vel prope," Curtis (GH); Aiken, June 1853, Ravenel (GH); pine barren, Summerville, June 10, 1891, Taylor (FM).

Georgia: mtns., Aug. 1841, Buckley (USN); between Tallulah Falls and Toccoa Falls, Habersham Co., Aug. 8, 1893, Small (USN,NYB,FM); Ocmulgee River

Swamp, below Macon, May 18-24, 1895, Small (FM).

FLORIDA: dry open pine barrens, June 21, 1881, Mohr (USN,FM); dry grassy hills near Marianna, June 24, 1881, Mohr (GH).

## 38. B. macilenta Small ex Larisey, sp. nov.37

Plant less than 1 m. high, sparsely appressed-pubescent in parts, darkening throughout in drying but apparently not blackening; stem somewhat stout, firm, ribbed, glabrous, simply branched, branches ascending-spreading; leaves subsessile to short-petiolate, petioles slightly pubescent, less than 3 mm. long; leaflets spatulate to elliptic-spatulate, slightly cuneate, apex broadly acute, usually apiculate, 3-6 cm. long, 1-1.5 cm.

<sup>&</sup>quot;Herba vix 1 m. alta, ex partibus sparse appresso-pubescens post exsiccationem fusca sed haud nigrescens ut videtur. Caules crassiusculi firmi striati glabri simplice ramosi, ramulis patulis ascendentibus. Folia subsessilia vel brevissime petiolata, petiolis paulo pubescentibus vix 3 mm. longis, foliolis spatulatis vel spatulato-ellipticis paulo cuneatis apice late acutis plerumque apiculatis 3-6 cm. longis 1.0-1.5 cm. latis delicate membranaccis leviter reticulatis nervo medio sparse ciliatis supra saturate viridibus subtus paulo glaucis, stipulis setaccis vix 3 mm. longis saepe caducis. Racemi vix bene cogniti sed ut videtur axillares erecti compacti folia vix superantes, bracteis incognitis caducis, pedicellis 4-5 mm. longis, calycis tubo 6-7 mm. alto extus glabrato intus dense pubescente, labri inferioris laciniis deltoideis 2.0-2.5 mm. longis, labro superiore distincte emarginato. Corolla flava, vexillo 1.5 cm. alto 1.1-1.3 cm. lato, alis carinaque 1.6-1.9 cm. longis. Ovarium dense pubescens. Legumen maturum ovoideum vel subglobosum 1.0-1.2 cm. longum 0.8-1.0 cm. latum nigrum firmum vel fragile rugosum sparse pubescens longe stipitatum, stipite calycem bis superante longe angusteque rostrato.

broad, delicate, dark green above, somewhat glaucous below, finely reticulate, sparingly ciliate along the midvein; stipules setaceous, less than 3 mm. long, usually caducous; racemes imperfectly known, but apparently axillary, erect, compact, barely exceeding the foliage; floral bracts unknown, caducous; pedicels 4–5 mm. long; calyx-tube glabrate without, densely pubescent within, 6–7 mm. deep, upper lip distinctly emarginate, lobes of the lower lip deltoid, 2–2.5 mm. long; corolla dull yellow, standard 1.5 cm. high, 1.1–1.3 cm. broad, wings and keel 1.6–1.9 cm. long; ovary densely pubescent, mature pod ovoid to subglobose, 1–1.2 cm. long, 0.8–1 cm. broad, black, firm-but thin-walled, rugose, sparingly pubescent, long stipitate, stipe twice the length of the calyx, long- and slender-beaked.

It is a pleasure to publish this species in the name of the late Dr. John Kunkel Small whose work on the genus *Baptisia* has been the most comprehensive during the present century. Dr. Small had selected the type specimen and had drawn up a description under the name of *B. macilenta* to be published in his forthcoming work on the flora of the Southwest.

Distribution: prairies, western Louisiana.

CITATION OF SPECIMENS:

LOUISIANA: Chataignier, W. La., June 21, 1885, Langlois (NYB, TYPE).

39. B. riparia Larisey, sp. nov.38

Plant about 1 m. (?) high, sparingly pubescent in parts, blackening, somewhat glaucous throughout; stem stout, ribbed, glabrous, secondary branches arising alternately from a single

<sup>&</sup>lt;sup>28</sup>Herba circiter 1 m. alta plus minusve pubescens omnino paulo glauca postremo nigrescens. Caules crassiusculi striati glabri, ramis alternatis, ramulis secondariis ultimisque subdichotomis geniculatis ascendentibusque. Folia glabra marginibus juventate exceptis, petiolis 4–7 mm. longis, foliolis plerumque obovatis saepe oblanceolatis cuneatis apice obtusis vel late acutis raro paulo retusis vel apiculatis 5.5–7.0 cm. longis 1.5–2.5 cm. latis membranaceis utrinque leviter reticulatis, stipulis deltoideis lanceolatis vel setaceis saepe vix 2 mm. excedentibus caducis vel persistentibus marginibus pubescentibus. Racemi terminales erecti paulo flexuosi 1.0–1.5 dm. longi folia haud excedenti, bracteis lanceolatis 3–4 mm. longis caducis. Flores subverticillati pallide lutei, pedicello 4 mm. longo, calyce nigro glabro 8–9 mm. longo, labro superiore integro truncato vel paululo emarginato, labro inferiore 2.5–3.0 mm. longo, lobis deltoideis. Corollae vexillo 1.5–1.7 cm. alto 1.5–1.6 cm. lato, alis carinaque 2.0–2.3 cm. longis, ovario dense luteo-sericeo. Legumen maturum ignotum.

primary stem, tertiary and subsequent branches subdichotomous, geniculate, ascending; leaves glabrous except along margins in bud, petioles 4-7 mm. long, leaflets firm but fairly delicate, lightly reticulate on both surfaces, mostly obovate, occasionally oblanceolate, cuneate, apex obtuse or broadly acute, only rarely slightly retuse or apiculate, 5.5-7 cm. long, 1.5-2.5 cm, broad; stipules pubescent along margins, deltoid, lanceolate or setaceous, not usually exceeding 2 mm. long, caducous or persistent; racemes terminal, erect, somewhat flexuous, 1-1.5 dm. long, not exceeding the foliage, flowers subverticillate; floral bracts lanceolate, 3-4 mm. long, caducous; pedicels 4 mm. long: calvx black, glabrous, 8-9 mm. deep, upper lip entire, truncate or slightly notched, lobes of the lower lip deltoid, 2.5-3 mm. long; corolla pale yellow, standard 1.5-1.7 cm. high, 1.5-1.6 cm. wide, wings and keel 2-2.3 cm. long; ovary thickly pubescent with silky yellow hairs, mature pod not known.

Distribution: along river banks in northwestern Florida.

CITATION OF SPECIMENS:

FLORIDA: banks of Ochlockonee River, 10 mi. west of Tallahassee, April 20, 1933, Totten (UNC,TYPE).

# 40. B. riparia Larisey var. minima Larisey, var. nov.39

As the species except: plant 3.5-5 (f) dm. high, stem slender, sparingly pubescent in younger parts, crown of white hairs at nodes; petioles pubescent, 5-8 mm. long, leaflets pubescent along midvein of lower surface, oblanceolate-elliptic, 3.5-5 cm. long, 1-1.5 cm. broad; stipules lanceolate, 0.5-1 cm. long, persistent; racemes 1 dm. long; upper calyx-lobe entire, rounded or truncate, lower lobes ovate-deltoid; ovary pubescent with white silky hairs.

Distribution: along river banks in northwestern Florida.

CITATION OF SPECIMENS:

FLORIDA: woods near Ochlockonee River, Havana, Gadsden Co., April 15, 1934, Griscom 21581 (GH,TYPE).

<sup>&</sup>lt;sup>26</sup> Ab specie differt: plantis verisimiliter 3.5-5 dm. altis, ramis gracilibus juventate paulo pubescentibus, nodis barbulatis; petiolis pubescentibus 5-8 mm. longis, foliolis oblanecolato-ellipticis 3.5-5.0 cm. longis, 1.0-1.5 cm. latis nervo medio subtus pubescentibus, stipulis lanecolatis persistentibus 0.5-1 cm. longis; racemis 1 dm. longis; calycis labro superiore integro rotundato vel truncato labro inferiore ovato-deltoideo; ovario villoso.

41. B. megacarpa Chapman ex Torr. & Gray, Fl. N. Am. 1: 386. 1840; Chapman, Fl. South. U. S., ed. 1, 111. 1860, ed. 2, 111. 1889, and ed. 3, 121. 1897; Small, Fl. Southeast. U. S., ed. 1, 600. 1903, and ed. 2, 600. 1913; Small, Man. Southeast. Fl. 677. 1933.

Plant 1 m. or less high, not blackening in drying; stem somewhat stout, firm, lightly ribbed, sparsely pubescent in young parts, glabrate, glaucous, with slender, widely spreading branches; leaves on slender petioles, 1.2-2 cm. long; leaflets broadly elliptic, pale yellow-green, delicate, primary and secondary veins prominent, the latter more or less parallel, pubescent to glabrate and somewhat glaucous beneath, 4-5 cm. long. 1.5 cm. broad; stipules lanceolate, 0.5-1 cm. long, persistent or caducous; terminal raceme up to 1.5 dm. long, lateral racemes usually less than 1 dm. long, all borne opposite the branches, not exceeding the foliage; pedicels slender, 1.2-1.5 cm. long; calyx-tube 8-9 mm. deep, upper lip ovate, cleft about 1 mm., lobes of the lower lip deltoid or deltoid-ovate, 2-3 mm. long, sinuses frequently quite wide; corolla pale yellow, standard 1.7 cm. high, 1.5 cm. broad, wings and keel 2.2 cm. long; ovary glabrous, mature pod yellowish tan, parchment-like, fragile, strongly reticulate, elipsoid to ovoid, greatly inflated, 3.5-5 cm. long, 2-2.5 cm. wide, slender-stipitate, stipe not exceeding the calyx, short-beaked.

Distribution: rich soil, central Florida.

CITATION OF SPECIMENS:

FLORIDA: no definite locality, Chapman (GH,NYB); no definite locality, "Chapman mis. 1846" (MBG,TYFE); Aspalaga, Mar. 1897, ex Herb. Chapman (MBG); Aspalaga, May 1898, ex Herb. Chapman (MBG); Gadsden Co., Chapman (MBG); "Talogie" Creek, Gadsden Co., 1836, Chapman (USN); "in calcareis prope Cupaloga, Mai 1843," Rugel (NYB); no definite locality, ex Herb. J. Torrey (GH).

42. B. sphaerocarpa Nutt. in Jour. Acad. Nat. Sci. Phila. 7: 97. 1834; Torr. & Gray, Fl. N. Am. 1: 384. 1840; Canby in Bot. Gaz. 4: 131. 1879; Small, Fl. Southeast. U. S., ed. 1, 599. 1903, and ed. 2, 599. 1913.

Plant 1 m. or less high, more or less tawny- (rarely whitish-) pubescent throughout, frequently glabrate in age; stem solitary, stout, relatively firm but occasionally delicate, heavily

ribbed, yellow through deep ferruginous or brownish-black, simply branched, branches straight, ascending, frequently somewhat twisted; leaves deep yellow-green, darkening into olive or brownish black upon drying, compound, subsessile to short-petiolate, petioles 1-3 mm. long, stout, channelled: young leaflets pubescent, mature glabrate, delicate, mid-vein prominent but otherwise not reticulate, broadly oblanceolate to obovate, occasionally elliptic, obtuse to obtusely acuminate, rarely retuse, never mucronate, 4.5-8 cm. long, 1.5-3.5 cm. broad; stipules narrowly lanceolate, 5 mm. long, to minute, setaceous, usually caducous, occasionally persistent; racemes terminal, 2-3 dm. long, slightly flexuous, axis twisted; flowers numerous, usually subverticillate, pedicels stout, 2-5 (rarely 8) mm. long; floral bracts lanceolate, 4-6 mm. long, caducous; calvx-tube reddish-brown or black, 0.8-1 cm. deep, upper lip cleft about 1 mm. but not usually separating, lobes of the lower lip lanceolate, 4-5 mm. long; corolla pale through deep vellow. standard slightly emarginate, 1.5-1.8 cm. high, 1.2-1.6 cm. broad, wings and keel 1.8-2.2 cm. long; pod ligneous, pericarp 2-3 mm. thick, glabrous, smooth or slightly rugose, ferruginous to brownish black, globose, usually as broad as long, 1.5-1.8 cm. long, 1.5-1.8 cm. broad, long-stipitate, stipe 5-8 mm. long, abruptly short-beaked.

Hybridizes with B. leucantha in Oklahoma, and B. leucophaea in Arkansas and Oklahoma.

Distribution: along stream banks and in moist ravines, or occasionally in open prairies of Arkansas and Oklahoma.

CITATION OF SPECIMENS:

ARKANSAS: Fort Smith, Bigelow 1853-4 (USN,NYB); near Conway, Faulkner Co., spring 1936, Diemer 1435 (MBG); vicinity of Little Rock, May 1837, Engelmann (MBG); Little Rock, Gray (GH); ravines, Little Rock, May 2, 1885, Hasse A 510 (ANSP); ereek bottom, June 1885, Little Rock, Hasse 247 (MBG); Little Rock, May and July 1885, Hasse (NYB); near Little Rock, May 28, 1886, Hasse (MBG); vicinity of Fort Tawson, June and July, Leavenworth (NYB); Little Rock, May 18, 1884, Letterman (MBG,NYB,ANSP); along stream, highway 67/70, outskirts of Little Rock, Pulaski Co., April 27, 1935, Lodewyks 163 (MBG); prairie, Nuttall (ANSP,TYPE, NYB); moist open ground near Hot Springs, Garland Co., May 15, 1924, Palmer 24956 (MBG); along banks of small stream near Mansfield, Sebastian Co., May 24, 1931, Palmer 39302 (MBG,NYB, GH).

OKLAHOMA: prairies, without definite locality, April 29, 1905, Bebb 21004 (WU); Limestone Gap, May 10, 1887, Butler (MBG,USN); low hills, Ouachita Nat. For., Talihina, Le Flore Co., May 17, 1936, Demarce 12700 (NYB); near Fanshawe, Le Flore Co., May 5, 1935, Goodman 2552 (MBG); dry field west of Sulphur, Murray Co., May 1, 1926, Stratton (MBG).

# 43. B. viridis Larisey, sp. nov. 40

Plant 1 m. or less high, more or less appressed-pubescent when young, frequently glabrate in parts at maturity; stem occasionally solitary, usually several, slender, firm, lightly ribbed, straw-colored to reddish-tan, widely branched, lower branches dichotomous, terminal and lateral ones strongly geniculate, usually ascending; leaves pale yellow-green, retaining color in drying, pubescent above and below; lowermost trifoliolate, petiolate, petioles 0.3–1 cm. long, leaflets oblanceolate to obovate with slightly cuneate base, or elliptic, obtuse, retuse or slightly mucronate at apex, 2.5–5 cm. long, 1–2.5 cm. broad, lateral leaflets usually ascending, somewhat smaller than the terminal leaflet; leaves of terminal and lateral geniculate branches bifoliolate or unifoliate, petiolate, petioles 2–5 mm. long, leaflets frequently unequal in size, broadly elliptic, 2.5–5 cm. long, 1–3 cm. broad, as long or twice as long as the

<sup>&</sup>quot;Herba 1 m. vel minor alta juventate plus minusve appresse-pubescens maturitate saepe glabrata. Caules plerumque plures aliquando solitarii graciliusculi firmi paulo striati straminei vel fulvi late ramosi inferne dichotomi superne valde geniculati plerumque ascendentes. Folia diuturne dilute stramineo-viridia utrinque pubescentia, inferiora 3-foliolata petiolata, foliolis obovatis vel oblanceolatis vel ellipticis apice retusis vel paulo mucronulatis basi paululo cuneatis 2.5-5.0 cm. longis 1.0-2.5 cm. latis, lateralibus quam foliolo medio paululo minoribus saepissime ascendentibus, petiolo 3-10 mm. longo, superiora saepe 2-foliolata petiolata, petiolis 2-5 mm. longis saepissime 1-foliolata subsessilia vel brevissime petiolata late elliptica 2.5-5 cm. longa 1-3 cm. lata internodia aequantia vel 2-plo superantia; stipulis subulatis minutis saepissime caducis vel haud manifestis; racemi numerosi compacti erecti paulo flexuosi contorti, terminali 2-3 dm. longi, laterali saepe 1.5-2.5 dm. longi. Flores numerosi sat regulariter positi vel haud raro subverticillati, pedicellis crassiusculis 3-5 (raro 10) mm. longis, bracteis lanceolatis vel subsetaceis 3-5 mm. longis caducis; calycis tubo 4-7 mm. longo, labro superiore ovato paululo fisso sed vix lobato, labri inferiori lobis deltoideis vel lanceolatis acuminatis tubum ca. dimido aequantibus. Corolla saturate flava, vexillo orbiculari-reniforme 1.0-1.5 cm. longo 1 cm. lato reflexo, alis carinaque 1.5-2.0 cm. longis. Legumen subglobosum vel late oblongoideum 1.2-2.0 cm. longum, 1.4-1.6 cm. latum abrupte sed longe (10-13 mm.) rostratum glabrum lignosum fulvum, stipite 5-6 mm. longo calycem circumscissilem vix superante.

internodes, ascending; stipules subulate, minute, usually caducous, or lacking altogether; racemes numerous, compact, erect, slightly flexuous, axis twisted, the terminal 2-3 dm. long. the lateral usually only 1.5-2.5 dm. in length; flowers numerous, evenly spaced or occasionally subverticillate, pedicels stout, 3-5 (rarely 10) mm. long; floral bracts lanceolate to setaceous, 3-5 mm. in length, caducous; calyx-tube 4-7 mm. deep, upper lip ovate, slightly cleft but lobes rarely separating, lobes of lower lip deltoid to lanceolate, acuminate, at least one-half the length of the tube; corolla deep yellow, standard orbicular, reniform, 1 cm. broad, 1-1.5 cm. high, reflexed, wings and keel 1.5-2 cm. long; pod ligneous, pericarp 1-2 mm. thick, glabrous, reddish-tan, subglobose, frequently broader than long, 1.2-2 cm. long, 1.4-1.6 cm. broad, stipe 5-6 mm. long, barely exceeding the calvx which becomes circumscissile at the base, abruptly but long-beaked, beak 1-1.3 cm. long.

Hybridizes with B. leucantha in Louisiana and Texas, and B. leucophaea var. glabrescens in Louisiana and Texas.

Distribution: Louisiana, Arkansas, Oklahoma and south to Texas; introduced along railroads in Missouri.

#### CITATION OF SPECIMENS:

LOUISIANA: prairie west of Crowley, Acadia Parish, July 16, 1935, Brown 5809 (LU); prairie north of Crowley, Acadia Parish, April 26, 1936, Brown 6273 (LU); prairie along RR. 4 mi. north of Rayne, Acadia Parish, April 27, 1936, Brown 6293 (LU); prairies, Crowley, April 2, 1911, Cooks 10 (NYB,TU); prairies, Crowley, April 15, 1920, Cooks (TU); coast prairies between Rayne and Crowley, Acadia Parish, July 4, 1934, Harper 3235 (MBG,USN,GH,NYB); prairie about 1 mi. W. of Crowley, Acadia Parish, April 7, 1936, Harper 3475 (MBG,USN,GH, ANSP); prairies, Opelousas, April 1880, Langlois (NYB,PM); prairies, Alakapus, May 27, 1883, Langlois 11 (NYB); plains around Abbeville, May 28, 1883, Langlois (FM).

MISSOURI: Frisco RR., Tyson Station, St. Louis Co., 1900, Barnes (MBG); Frisco RR. 100 yards east of Allenton, May 25, 1896, Letterman (MBG); Allenton May 1897, Letterman (MBG); near Allenton on Frisco track, May 12, 1912, Letterman (MBG); cleared lands along Frisco RR., near Wynne Junction, Barry Co., June 5, 1926, Palmer 30463 (MBG); swales, cleared lands along RR. near Seligman, Berry Co., June 3, 1926, Palmer 30474 (MBG); Springfield, June 1907, Standley (USN).

ARKANSAS: May 1837, collector unknown (WU).

OKLAHOMA: lowlands, prairie, Wichita Mtns., April 18, 1928, Barkley (UD); without definite locality, 1877, Butler (MBG); dry ridge pastures, Davis, Murray Co., April 4 and 24, 1936, Demarce 12275 (UT,USN); prairie, Arbuckle Mtns.,

April 1908, Gage (UO); prairies, northwest of Hugo, May 12, 1930, Sears 1332 (UO); prairies, common in sandy soil near Colbert's Station, June 17, 1891, Sheldon 17 (UM, USN).

TEXAS: along RR. 2 mi. east of Pine Island, Jefferson Co., April 20, 1936, 4s. derson & Hubricht (MBG); Beaumont, April 15, 1930, Benke 5370 (GH,FM): sandy soil, Houston, Harris Co., April 10, 1903, Biltmore Herb. 14778 (UM); abundant on low flat coast prairie, Orange, April 17, 1899, Bray (USN,UT); Genoa, Harris Co., Mar. 19, 1938, Chandler 2684-A (MBG); Houston, Mar. 20, 1938, Chandler 2684-B (MBG); near Turning Basin, Harris Co., April 14, 1934, Cory 8131 (GH); 14 mi. southwest of Orange, Cow Bayou, Orange Co., May 15, 1937, Cory 22321 & 22322 (MBG); 2% mi. north of Paris, Lamar Co., May 21, 1937, Cory 23114 (MBG); Rio Brazos, 1833, Drummond (GH); prairies north of Houston, Harris Co., April 20, 1899, Eggert (MBG); dry hills north of Longview, Gregg Co., June 7, 1899, Eggert (MBG); Rosenberg, April 13, 1900, Eggert (MBG); Houston, April 5, 1913, Fisher 335 (USN); Houston, April 21, 1914, Fisher (WU); Houston, Mar. 22, 1938, Fisher 3844 (FM); wet prairies, Houston, Mar. 20, 1872, Hall 160 (MBG, TYPE, USN, GH, NYB, FM, COTYPES); no definite locality, Lindheimer (MBG); near Houston, April 1839, Lindheimer (MBG); Houston, Mar. 1842, Lindheimer (GH); Leonard, Collin Co., May 1, 1886, Merrill (NYB); Bonheur, April 16, 1896, Milligan 9515 (WU); no definite locality, 1889, Neally 69 (USN, NYB); no definite locality, May 1883, Oyster 23809 (WU); Columbia, Brazoria Co., Mar. 29, 1914, Palmer 5046 (MBG, USN, FM); prairies, Ganado, Jackson Co., Mar. 10, 1916, Palmer 9228 (MBG,USN); prairies near Texarkana, Bowie Co., April 23, 1923, Palmer 22436 (MBG,GH); along RR. at Eads Station, Smith Co., April 23, 1901, Reverchon 2655 (MBG); Sabine, April 25, 1903, Reverchon (MBG); 10 mi. south of Angleton, Brazoria Co., June 19, 1937, Reed 27556 (258) (MBG); sandy prairie, Beaumont, April 23, 1903, Reverchon 3738 (MBG); Dallas, June 26, 1903, Reverchon (MBG); prairies, Paris, April 10, 1904, Reverchon 4294 (MBG,GH); near Houston, May 6, 1899, Rose 4191 (USN, NYB, FM); Cleveland-Dayton, April 19, 1930, Tharp (UT); Chambers Co., April 7-10, 1936, Tharp (UT); El Campo, June 1923, Tharp 2314 (UT); Lovelady, April 21, 1933, Tharp (UT); gravelly hill across Mo. Pac. RR. at 24th St., Austin, Mar. 31, 1933, Tharp (UT); Walker Co., 1920, Warner 13 (USN); no definite locality, Wright (GH).

# 44. × B. fragilis Larisey, hyb. nov.41

 $= B. viridis \times leucantha.$ 

Plant about 1 m. high, minutely pubescent to glabrate throughout, blackening slightly in drying; stem slender, firm, or occasionally fairly stout, delicate, ribbed, reddish, somewhat glaucous, widely branched, branches ascending-spreading; leaves dark green, blackening slightly, usually compound, occasionally simple through fusion, irregularly lobed, peti-

<sup>&</sup>lt;sup>41</sup>Inter viridom et leucantham media; herba usque ad 1 m. alta; folia plerumque composita interdum simplicia irregulariter lobata, foliolis oblanceolatis vel obovatis cuneatis apice rotundatis plerumque apiculatis raro retusis; corolla flava.

olate, petioles 3-6 mm. long, leaflets usually glabrate at maturity, delicate, midvein prominent, not otherwise reticulate, margins revolute, oblanceolate to obovate, cuneate, rounded at apex, frequently apiculate, rarely retuse, 2.5-3.5 cm. long, 1.5 cm. broad; stipules minute, lanceolate to setaceous, 1-3 mm. long, usually caducous, occasionally persistent; racemes 1-2 dm. long, slightly flexuous; flowers subverticillate; floral bracts lanceolate to setaceous, 4 mm. long, caducous; pedicels 4-6 mm. long, fairly stout; calyx-tube black, 8-9 mm. deep, 6-7 mm. wide, upper lip entire or minutely cleft, lobes not usually separating, lobes of the lower lip broadly acute separated by a wide sinus, 2-2.5 mm. long; corolla yellow, blackening, standard emarginate, 1.5-1.7 cm. high, 1.4-1.5 cm. broad, wings and keel 2 cm. long; ovary black, glabrous, oblong, stipe equalling the length of the calyx, style 11-12 mm. long; mature pod imperfectly known, but ligneous.

Distribution: eastern Louisiana and Texas.

CITATION OF SPECIMENS:

LOUISIANA: along RB. 2 mi. east of Pine Island, Jefferson Co., April 20, 1936, Anderson & Hubricht (MBG,TYPE).

TEXAS: Nome, April 7, 1938, Fisher 3832 (FM).

**45**. × **B**. sulphurea Engelm. in Bot. Gaz. **3**: 65. 1878; Canby in Bot. Gaz. **4**: 132. 1879; Small, Fl. Southeast. U. S. 599, ed. 1. 1903, and ed. 2, 599. 1913.

= B.  $sphaerocarpa \times leucantha$ .

Plant at least 1 m. high, minutely pubescent or glabrate throughout, blackening in drying; stem solitary, fairly stout, delicate, ribbed, branches arising alternately from main stem, subdichotomous, spreading; leaves dark green, compound, petiolate, petioles 2–7 mm. long, young leaflets pubescent along margins and midvein, virtually glabrous at maturity, firm, midvein prominent on lower surface but otherwise not reticulate, broadly oblanceolate to obovate, slightly cuneate toward base, rounded, obtuse, slightly retuse, occasionally apiculate, 3.5–5 cm. long, 1.5–2.3 cm. broad, lateral leaflets converging, somewhat smaller than the primary leaflet; stipules lanceolate, 8–10 mm. long, persistent; racemes 1 dm. or less, flexuous, flowers subverticillate, floral bracts unknown, caducous; pedicels somes

what stout, 2-4 mm. long; calyx-tube black, 7-8 mm. deep, 6-7 mm. wide, upper lip entire, truncate, or slightly emarginate, lobes of the lower lip deltoid, 3 mm. deep; flowers dull yellow, standard 1.5-1.7 cm. high, 1.4-1.5 cm. broad, wings and keel 2-2.2 cm. long; ovary black, glabrous, glaucous, oblong-ovoid, stipe equalling the length of the calyx, beak 1-1.2 cm. long, slightly recurved; mature pod imperfectly known, but ligneous.

Distribution: prairies, Oklahoma.

CITATION OF SPECIMENS:

OKLAHOMA: rare, prairies, Tabaksi Co., "Indian Territory," fl. May, Butler (MBG, TYPE); prairies 10 mi. north of Limestone Gap, May 22, 1877, Butler (MBG, NYB, FM); Kiowa, between Arkansas and Red rivers, May 22, 1877, Butler (GH).

46. B. australis (L.) R. Br. in Ait. Hort. Kew., ed. 2, 3: 6. 1811; Ell. Sketch Bot. S. Car. & Ga. 1: 468. 1821; DC. Prodr. 2: 100. 1825; Maund, Bot. Gard. 6: 567. 1835-6; Torr. & Gray, Fl. N. Am. 1: 385. 1840; Ralph, Ic. Carpolog. 44, pl. 40. 1849; Chapman, Fl. South. U. S., ed. 1, 112. 1860, ed. 2, 112. 1889, and ed. 3, 121. 1897; Step, Fav. Fl. 1: 130, pl. 64. 1896; Britton & Brown, Illust. Fl. North. U. S. ed. 1, 2: 265, fig. 2049. 1897, in part, and ed. 2, 2: 344, fig. 2453. 1913, in part; Small, Fl. Southeast. U. S., ed. 1, 601. 1903, and ed. 2, 601. 1913; Sedgwick & Cameron, Gard. Month by Month, 144. 1907. Illust.; Gray, New Man. Bot., ed. 7, 506. 1908; Keeler, Gard. Fl. 241. 1910. Illust.; Mathews, Field Book Am. Wild Fl. 209. 1912. Illust.; Small, Man. Southeast. Fl. 678. 1933.

B. exaltata Sweet, Br. Fl. Gard. 1: pl. 97. 1825; Jour. Hort. III, 34: 511. 1897. Illust.

B. versicolor Lodd. Bot. Cab. 12: pl. 1144. 1826.

B. confusa Sweet ex G. Don, Gen. Syst. [Hort. Brit.], ed. 2, 123. 1830.

B. caerulea Michx. in Eaton & Wright, Man. N. Am. Bot., ed. 8, 154. 1840.

Sophora caerulea Trew, Pl. Rar. 6, pl. 14. 1779.

Sophora australis L. Syst. Veg., ed. 14, 391. 1784; Ait. Hort. Kew. 2: 45. 1789; Sims in Curt. Bot. Mag. I, 15: 509. 1801.

Podalyria australis Willd. in L. Sp. Pl., ed. 4, 2: 503. 1799; Vent. Desc. Fl. Nouv. Jard. Cels. 56, pl. 56. 1800. Ripasia cerulea Raf. New Fl. N. Am. 2: 48. 1836 [1837].

Plant 1.5 m. high, glabrous throughout, more or less glaucons: stem stout, furrowed, erect, simply branched, branches usually ascending, lateral ones occasionally spreading or drooping; leaves petiolate, petioles semiamplexicaul, channeled, 0.5-1.2 cm. long, leaflets somewhat delicate, subsessile to shortly petiolate, obovate to obovate-lanceolate, cuneate, slightly attenuate to obtuse, rarely retuse at the apex, 4-8 cm. long, 1.5-3 cm. broad; stipules lanceolate or ovate-lanceolate, acuminate, 0.7-1.5 cm. long, usually persistent; racemes loose, terminal, erect, flexuous, 2-5 cm. long; flowers distantly scattered, solitary or subverticillate; bracts ovate-lanceolate, 1-1.2 cm. long, caducous; pedicels slender, 0.7-1.2 cm. long; calyxtube 0.9-1 cm. deep. 5-7 mm. broad, upper lip barely cleft, lobes of the lower lip deltoid, acute, 2.5-3 mm. deep; corolla dull violet to deep blue, inner petals frequently lighter, standard deeply emarginate, sometimes auriculate, laterally reflexed, 2.2 cm. long, wings and keel 2.5 cm. long; mature pod grayish- to brownish-black, oblong-elliptic, firm, slightly inflated, wrinkled, 3.5-4 cm. long, 1-1.5 cm. broad, mucronate, short-stipitate, stipe not exceeding the calyx.

Distribution: rocky soil, clay or sand along river banks, Vermont to North Carolina, west to southern Indiana and Tennessee.

CITATION OF SPECIMENS:

VERMONT: Westminster, Sept. 29, 1901, Blanchard (GH); Royalton, July 18, 1891, Eggleston 2565 (GH,NYB,UM); established on bank of White River, Royalton, June 25, 1902, Eggleston 2847 (GH,NYB); by White River, Royalton, June 12, 1900, Wild (GH).

PENNSYLVANIA: on sand bars along Allegheny River below Aspinwall, Allegheny Co., June 6, 1933, Bright 8820 (UM); Brownsville, Fayette Co., Aug. 16, 1868, Garber (MBG,GH,ANSP); abundant, Clarion River, 1845, Henderson (ANSP); Allegheny Co., June 14, 1869, Knife (USN,NYB); sandy shores, Allegheny River 7 mi. above Pittsburgh, Shafer 615 (GH); Allegheny River bank at mouth of Bear Creek, Allegheny Co., June 8, 1884, Shafer (UM).

MARYLAND: gravelly river bank, High Island, May 19, 1895, Kearney (OU); rocky flat, Chain Bridge, June 17, 1924, Pennell 12082 (ANSP); rocky islands, Potomac, Montgomery Co., June 6, 1881, Smith (USN); Chain Bridge, Oct. 1897, Tidestrom (ND).

DISTRICT OF COLUMBIA: vicinity of Washington, Sept. 20, 1873, Chickering (ND); vicinity of Washington, May 30, 1874, Chickering (NYB); along Potomac

River near Glen Echo Junction, Aug. 30, 1905, House 1484 (MBG); near Washington, 1884, McCarthy 53 (UN); moist grounds, banks of the Potomac, Washington, May 22, 1877, Morong (MBG,NYB); Potomac Flats near Chain Bridge, Washington, July 14, 1895, Pollard 501 (NYB); near Chain Bridge along Potomac River, above Washington, July 4, 1912, Russell (UM); rocky flats of Potomac, May 9, June 27, 1896, Steele (DU,UM); vicinity of Washington, May 25, Sept. 21, 1879, Ward (MBG); Little Falls of Potomac, May 30, 1909, Williamson (ANSP).

VIRGINIA: James River south of Natural Bridge Station, May 30, 1909, Bartram (NYB,GH); Harper's Ferry, June 1872, Canby (ANSP); Harper's Ferry, May 21, 1911, Greene (ND); bank of Shenandoah River, Page Co., May 23, 1900, Miller (USN); Carter's Ferry, Draper's Valley, Pulaski Co., June 4, 1871, Shriver (GH). NORTH CAROLINA: Willardville, Ashe (NYB); waste grounds between Watts and Dollar Streets, Durham, Durham Co., May 8, 1938, Blomquist 10253 (UNC);

no definite locality, May 1884, McCarthy (WU).

OHIO: gravel beaches of Little Miami, Terrace Park, Sept. 20, 1910, Braun (LB); gravel beaches of Little Miami, Terrace Park, May 25, 1911, Braun (LB); Monroe Co., 1892, Herzer (OU); Olive Twp., Meigs Co., May 30, 1936, Jones (NYB, OU); Pomeroy, Meigs Co., Aug. 26, 1895, Kellerman (OU); river bank near Cininati, June, Lea 10-1 (ANSP); Steubenville, May 25, 1878, Merts (NYB); Fernbank on banks of river near North Bend, Short (ANSP); Cincinnati, Hamilton Co., July 1879, Spurlock (OU); Leroy, Lake Co., Tyler (OU); near Painesville, June 5, 1888, Werner (UM).

WEST VIRGINIA: near mouth of Blue Stone River, Summers Co., July 16, 1930, Berkley 1116 (MBG); near Wheeling, May 25, 1878, Merts (GH); shores of Ohio River, Wheeling, May 31, July 28, 1879, Merts (USN,ANSP); near mouth of Blue Stone River, Summers Co., July 16, 1929, W. U. U. Bot. Exp. (GH); vicinity of

Thurmond, June 22, 1903, Biltmore 136c (UM).

INDIANA: along river bank 3 mi. east of Madison, May 25, 1936, Banta 10877 (IU); river bank, Madison, May 5, 1878, Barnes (MBG,WU); Hanover, Coulter (MBG); hard clay, rocky soil, slope of bank of Ohio River 4 mi. east of Madison, Jefferson Co., Sept. 23, 1919, Deam 30,167 (CD); rare on low rocky bank of the Ohio River at Chas. Dean's Landing, Jefferson Co., June 19, 1923, Deam 38,901 (CD); frequent on stony ledges of slope of bank of the Ohio River about 2 mi. east of North, Switzerland Co., May 29, 1930, Deam 48,558 (CD); rocky slope of the bank of the Ohio River 2 mi. north of Derby, Perry Co., Deam 51,592 (CD); rare along the N. Y. Cent. tracks in Lake Co., near the Porter Co. line, June 9, 1935, Hull (CD); sandy shore, Ohio River, Marble Hill, Jefferson Co., June 19, 1923, Pennell 11780 (ANSP); low wet ground along the Ohio River 3 mi. east of Madison, May 16, 1925, Weatherwax 3205 (IU).

KENTUCKY: river bank, South Fork, Cumberland Rd., McCreary Co., June 18, 1935, Braun (LB); Ohio River bank near Warsaw, Gallatin Co., June 1, 1936, Braun (LB); no definite locality, Chapman (NYB); Shelbyville, Flint (GH); banks of the Ohio River, coll. of 1860, Short (MBG,ANSP); rocky banks 8 minortheast of Elizabethtown, Hardin Co., Sept. 6, 1927, Wherry & Pennell 13659

(ANSP).

TENNESSEE: Orchard Knob near Chattanooga, May 4, 1902, Canby 25 (GH); La Vergne, June 1885, Gattinger (USN); river bank, Clinch River near Kyles Ford, Hancock Co., July 27, 1935, Underwood & Sharp 3050 (CD).

47. B. minor Lehm. Ind. Semin. Hort. Hamb. 16. 1827; in Linnaea 3: Litt. 119. 1828; in Nov. Act. Nat. Cur. (Leop. Carol. Deutsch. Akad. Naturforsch. Nova Acta) 14: 803. 1828 [1829]; Larisey in Am. Jour. Bot. 26: 538–39. 1939.

B. australis (L.) R. Br. var. β, Torr. & Gray, Fl. N. Am. 1:

385. 1840.

B. texana Buckl. in Proc. Acad. Nat. Sci. Phila. 13: 452. 1861; Ibid. 14: 163. 1862.

B. vespertina Small ex Rydb. Fl. Prairies & Plains Central N. Am. 456. 1932.

B. australis (L.) R. Br. var. minor Fernald in Rhodora 39: 312, 1937.

Plant 6-12 dm. high, glabrous throughout, more or less glaucous; stem slender, firm, lightly ribbed, geniculate, widely dichotomously branched; leaves subsessile to short-petiolate, petioles 2-4 mm. long, leaflets firm, reticulate, obovate to obovate-cuneate, occasionally elliptic, apiculate, rarely obtuse or retuse, 2-3.4 cm. long, 0.5-1 cm. broad; stipules lanceolate to setaceous, 3-9 mm. long, persistent or caducous; racemes terminal, erect, compact, not usually flexuous, 1-2.5 dm. (rarely 3.5 dm.) long; flowers usually evenly spaced, sometimes subverticillate but very closely arranged; floral bracts cordate- to ovate-lanceolate, 7-9 mm. long, caducous; pedicels stout, 5-7 mm. long; calyx-tube 9-10 mm. deep, 6-8 mm. broad, upper lip subconnate, lobes of lower lip usually ovate, sometimes acute, 2-3 mm. long; corolla dull violet to deep blue, inner petals lighter, frequently tinged with yellow, standard emarginate, laterally reflexed, 2.5 cm. long, wings and keel 2.7-3 cm. long; mature pod oblong, brownish-black, ligneous but brittle, much inflated, not wrinkled, 3-6 cm. long, 1.5-2.5 cm. broad, tapering gradually into a short beak, long-stipitate, stipe twice as long as the calyx.

Hybridizes with B. leucophaea in Missouri, Kansas and Oklahoma.

Distribution: dry hills, limestone glades and prairies, Missouri and Kansas, southwest to Texas; introduced along railroads in Nebraska.

CITATION OF SPECIMENS:

MISSOURI: center of long glade, Ledge Ridge, Mo. Bot. Gard. Arboretum, Grav Summit, Franklin Co., May 16, 1937, Anderson (MBG); St. Genevieve Co., May 7, 1939, Anderson (MBG); uncommon, introduced, Courtney, Jackson Co., May 13, 1896, Bush 325 (MBG); common in barrens, Eagle Rock, June 2, 1897, Bush 27 (MBG); common on prairie, Webb City, May 12, 1902, Bush 1585 (MBG); prairies, Lake City, May 20, 1921, Bush 9358-A (MBG); rocky glades, Reed's Spring, April 30, 1936, Bush 15346 (MBG); barrens, Baxter, May 27, 1936, Bush 15565 (MBG); glades, Gray Summit, May 1, 1938, Cutler (MBG); Jefferson Co., June 23, 1891, Eggert (MBG); dry hills north of DeKalb, Jefferson Co., June 24, 1891, Eggert (MBG); dry hills north of Victoria, Jefferson Co., July 7, 1891, Eg. gert (MBG); Hematite, Jefferson Co., July 7, 1891, Eggert (MBG, NYB); rocky open places, Jefferson Co., May 22, 1892 (June 23, 1891), Eggert (GH); dry hills, St. Francois Co., June 10 (July 3), 1892, Eggert (GH); Victoria, Jefferson Co., May 21, 1893, Eggert (MBG,NYB); Victoria, May 11, 1896, Eggert (MBG, NYB); dry rocky hills north of De Soto, June 27, 1898, Eggert (MBG); glades, De Soto, Jefferson Co., Ham (NYB); Jefferson Co., May 28, 1887, Hasse (MBG); Victoria, Jefferson Co., July 8, 1890, Hitchcock (MBG); Dittmer, Jefferson Co., June 10, 1928, Kellogg 1797 (MBG); Allenton, May 10, June 20, 1896, Letterman (MBG,NYB); Allenton, May 5, 1897, Letterman (MBG); near Crescent, Aug. 3, 1911, Letterman (NYB); uncommon, introduced along RR., Sheffield, Jackson Co., May 23, 1896, Mackensie 844 (MBG); rare, Santa Fe RR. near Rock Creek, May 23, 1896, Mackenzie (NYB); open limestone slopes of "Bald Joe," Stone Co., April 30, 1924, Palmer 24622 (MBG); rocky slopes, bald knobs, along Mo.-Ark. state line near Eagle Rock, Barry Co., April 30, 1926, Palmer 29851 (MBG); limestone glades 4 mi. north of Bloomsdale, St. Genevieve Co., June 12, 1930, Steyermark 1482 (MBG); limestone glade in upland woods near Pomme de Terre River, 11/2 mi. west of Doran Spring, 4 mi. south of Hermitage, Hickory Co., July 12, 1934, Steyermark 13380 (MBG); natural prairie between Caplinger Mills and Stockton, about 3 mi. north of Stockton, Cedar Co., July 13, 1934, Steyermark 18422 (MBG); rocky upland prairie glade 5 mi. north of Warsaw, Benton Co., May 24, 1936, Steyermark 10700a (MBG); upper lime barrens on top of bluff along Pomme de Terre River around Buzzard's Roost, 2 mi. northeast of Rondo, Polk Co., Aug. 1, 1937, Steyermark 24100 (MBG); glades of Jefferson Co., May 24, 1885, Wislizenus 96 (MBG).

ARKANSAS: open places, Carroll Co., May 9, 1936, Bush 15375 (MBG); Beaver, April 21, 1929, Davis (WU); Eureka Springs, April 30, 1909, Kellogg (MBG); no definite locality, Nuttall (ANSP); common, dolomite hills, Carroll Co., April 20, 1929, Palm 6507 (USN); open rocky hillsides, Eureka Springs, Carroll Co., May 10, 20, 1914, Palmer 5523 (MBG); in grassy situations, Pitcher (ANSP); Eureka

Springs, April 19, 1899, Trelease (MBG).

NEBRASKA: probably Jefferson Co., Knight (UN); apparently very rare, RR. south of Pioneer Park near Lincoln, Le acaster Co., May 15, 1934, Sperry (UN).

KANSAS: Geuda, Sumner Co., May 5, 1886, Bassler (UM); Kanopolis, Ellsworth Co., summer of 1898, Becker (KA); prairies, Lindsborg, May 1887, Bodin (UM); hillside not far from Lake City, Barber Co., May 2, 1936, Bondy 396 (MBG); on high prairie, Greenwood Co., May 8, 1879, Broadhead (MBG); Strong City, Chase Co., May 7, 1888, Carleton (KA); Washington Co., July 24, 1897, Clothier & Whitford (KA); Labette Co., Aug. 18, 1897, Clothier & Whitford (KA); Elk Co., Aug. 20 & 21, 1897, Clothier & Whitford (KA); Cowley Co., Aug. 22, 1897, Clothier &

Whitford (KA); Sedgwick Co., Aug. 24, 1897, Clothier & Whitford (KA); Woodson Co., Aug. 29, 1897, Clothier & Whitford (KA); prairies, Edwards Co., May 1932, Finch 23 (MBG); Cloud Co., 1930, Fraser 328 (KA); herb in the sand dunes of Medora, Reno Co., May 14, 1932, Gates 17098 (KA); herb in the prairie at northwest corner of Wingfield Twp., Oct. 3, 1935, Gates 18643 (MBG); Ft. Riley, May 16, 1892, Gayle 461 (NYB); Wilson Co., May 5, 1896, Haller (KA); widely distributed southeast of Salina, Saline Co., April 24, 1930, Hancin 178 (KA); Manhattan, May 10, 1883, Higginbotham (KA); Fairchild, Hitchcock (KA); White Water, Butler Co., July 1892, Hitchcock (KA); Concordia, Cloud Co., June 17, 1897, Hitchcock (KA); Clay Co., July 1895, Hitchcock (KA); Lincoln Co., July 1895, Hitchcock (KA); Ottawa Co., July 1895, Hitchcock (KA); Barton Co., Aug. 1895, Hitchcock (KA); Morris Co., Aug. 1895, Hitchcock (KA); Rice Co., Aug. 1895, Hitchcock (KA); Franklin Co., July 1896, Hitchcock (KA); Anderson Co., July 1896, Hitchcock (KA); Pratt Co., Aug. 1896, Hitchcock (KA); Harper Co., Aug. 1896, Hitchcock (KA); Edwards Co., Sept. 1, 1897, Hitchcock (KA); Stafford Co., Sept. 1, 1897, Hitchcock (KA); Manhattan, April 26, 1891, Jackson (NYB); prairie southeast of Monmouth, Cherokee Co., May 2, 1930, Jacobs 18 (KA); Manhattan, May 17, 1887, Kellerman (KA); Manhattan, Riley Co., May 28, 1889, Kellerman (MBG); Shawnee Co., Aug. 20, 1896, Lockhart (KA); dry prairie west of Wabaunsee, Wabaunsee Co., May 9, 1927, Maus 13 (KA); near Altamont, Labette Co., May 11, 1924, Nelson (KA); prairie, Riley Co., Sept. 18, 1895, Norton (MBG, NYB, KA, NMC); south of Smith Hill, June 1867, Parry (MBG); common at Salina, June 1, 1867, Parry (MBG); no definite locality, Oct. 1934, Pennell 19329 (MBG); Wichita, May 1903, Poole 75 (GH); vicinity of South Haven, along the road, 4 mi. east of town, July 4, 1929, Rydberg & Imler 579 (NYB); vicinity of Coldwater, camp ground, July 6, 1929, Rydberg & Imler 676 (NYB); Emporia, May 13, 1890, Tyler (MBG); Wichita, Sedgwick Co., May 1929, Wellman (WU); Cowley Co., April 1898, White (MBG); open knolls 5 mi. north of Manhattan, Riley Co., May 16, 1935, Williams & Williams 2110 (MBG); prairies near Pleasant Valley Creek, 150 mi. southwest of Independence, May 28, 1846, Wislizenus (MBG).

OKLAHOMA: dry open places 1/2 mi. east of Norman, April 29, 1927, Babb 120 (UO); Woodward, Aug. 29, 1892, Bailey (GH); dry upland 4 mi. east of Norman, April 30, 1928, Barkley (UO); open prairie 2 mi. southwest of Norman, June 18, 1928, Berry 45 (UO); Huntsville, Kingfisher Co., April 28, 1896, Blankinship (GH, WU); Lincoln Co., May 6, 1896, Blankinship (GH); Huntsville, Kingfisher Co., May 20, 1896, Blankinship (MBG); common, Catoosa, May 8, 1895, Bush 910 (MBG,NYB,ND,UM); without definite locality, coll. of 1877, Butler 4 (MBG); Arbuckle Mtns. above Turner Falls, Davis, Murray Co., April 24, 1936, Demaree 12282 (UT); prairie north of Woodward, Woodward Co., June 5, 1901, Eggert (MBG); Cherokees, June 1835, Engelmann 179 (MBG); dry waste land or native grass land, Spike Hill, Arbuckle Mtns. April 4, 1927, Fieder 86 (UO); Arbuckle Mtns., April 27, 1935, Goodman 2456 (MBG); breaks of Canadian River at Pack Saddle Bridge, Ellis Co., May 26, 1935, Goodman 2583 (MBG); rich soil east of Norman, May 4, 1930, Gowan 68 (UO); prairies 21/2 mi. north of Norman, May 8, 1930, Gowan (UO); grassy creek valley near Mannsville, Johnston Co., May 5, 1916, Griffith 3493 (MBG,GH); Norman, May 5, 1917, Jeffs (UO); prairie northeast of Oklahoma City, April 29, 1928, Johnston (UO); Fort Supply, Kimball (MBG); west of Alva, June 1, 1931, McKelvey 2496 (GH); west of Tulsa, June 2, 1931, McKelvey 2513 (GH); Platt Nat. Park, top of Bromide Mtn., April 5, 1935, Merrill 80 (NYB); Stillwater, May 1, 1897, Myers (OAM); in open places near Sulphur, June 15, 1930, Ruth 1616 (USN); grassy side of Red Butte near Cora, Woods Co., May 21, 1913, Stevens 545 (GH,UM); prairie near Alva, Woods Co., May 22, 1915, Stevens 547½ (MBG,GH,NYB,UM); in open dry woods near Miami, Ottawa Co., Aug. 26, 1913, Stevens 2291 (GH,NYB).

TEXAS: northern Texas, May, Buckley (ANSP,TYPE of B. texana Buckl.); near McKinney, April 11, 1904, Freeman (MBG); Lipscomb, July 1, 1903, Howell 6 (USN); 7 mi. east of McLean, Wheeler Co., Hubricht, Shoop, Heinze B1451 (MBG); Leonard, Collin Co., May 1, 1886, Merrill (NYB); Bonheur, April 25, 1896, Milligan 9516 (WU); Grayson Co., April 10, 1933, Polson (UT); limestone bluff, Dallas, 1880, Reverchon 183 (MBG); prairies, Sherman, April 22, 1904, Reverchon 4293 (MBG,GH,NYB); waste places, vicinity of Dallas, April 27, 1929, Stephenson 168 (UT).

CULTIVATED SPECIMENS: ex Hort. Hamb. "A." 1827, Lehmann (GH, TYPE).

# 48. B. minor Lehm. var. aberrans Larisey, var. nov. 42

As the species except: branches usually subdichotomousascending rather than dichotomous-spreading-drooping; leaflets obovate-oblanceolate; racemes occasionally intercalary, flowers frequently somewhat smaller; occurs out of natural range.

Distribution: dry open ground or hills, central North Carolina southwest to northwestern Georgia and adjacent Tennessee.

CITATION OF SPECIMENS:

NORTH CAROLINA: Stokes Co., June 1896, Ashe (MBG,OU); open dry ground, Durham, Durham Co., May 27, 1930, Blomquist (DU); upper New Hope Creek, Duke Forest, Orange Co., May 8, 1933, Lynn (DU); Durham, Durham Co., May 1917, Wolfe (DU).

GEORGIA: sandy roadside 8.5 mi. south of Chickamauga, Walker Co., April 24, 1938, Pyron & McVaugh 2690 (MBG,TYPE).

TENNESSEE: hills above Chattanooga, May 25, 1876, Engelmann (MBG); Chattanooga, June 11, 1883, James (OU).

49.  $\times$  B. bicolor Greenman & Larisey in Am. Jour. Bot. 26. 539. 1939.

= B. minor × leucophaea.

Plant less than 1 m. high, tawny-pubescent in parts, blackening slightly in drying; stem somewhat stout, heavily ribbed, finely pubescent to glabrate, somewhat glaucous, simple below,

<sup>\*</sup>Ab specie differt ramis plerumque subdichotomo-ascendentibus haud dichotome patulo-nutantibus; foliolis obovato-oblanceolatis; racemis subinde intercalatis; floribus frequenter paulo minoribus.

subdichotomously branched and divaricately spreading above: leaves subsessile to short-petiolate, petioles 2-4 mm. long; leaflets spatulate-oblanceolate to narrowly obovate, 1.5-5.5 cm. long, 0.5-1 cm. broad, glabrous or sparingly pubescent toward the base and along the midrib and margins; stipules triangularto ovate-lanceolate, 0.5-2 cm. long, usually persistent; racemes axillary, 1-3.5 dm. long, frequently flexuous, not usually secund: floral bracts ovate- to lanceolate-acuminate, 0.9-1.7 cm. long, usually persistent, occasionally caducous; pedicels stout, 0.5-2 cm. long, glabrate; calyx-tube 1 cm. deep, upper lip entire, ovate, or slightly emarginate, lobes of the lower lip deltoid, 3-3.5 mm. long; corolla bicolorous, standard purple, 2-2.2 cm. high, 1.8-2 cm. broad, wings and keel cream or yellow, 2-2.4 cm. long; ovary densely pubescent, mature pod oblongoid, barely inflated, somewhat distorted, narrowed at both ends, tapering gradually into a long stipe and persistent style, body 2.5-3.5 cm. long, 0.8-1.2 cm. broad, strongly reticulate, somewhat strigillose.

Distribution: prairies, southwestern Missouri, Kansas, and Oklahoma.

CITATION OF SPECIMENS:

MISSOURI: glades, Dittmer, Jefferson Co., May 4, 1930, Kellogg 15216 (MBG); frequent on upland prairies, Webb City, Jasper Co., May 4, 1902, Palmer 127 (MBG, TYPE); rocky upland prairies near Webb City, Jasper Co., May 10, 1931, Palmer 39282 (MBG,GH,NYB).

KANSAS: rich, black soil, stony prairie land 1 mi. southwest of College, Riley Co., May 7, Bayliss (KA); on hills west of Poor House, April 13, Dolby (KA); about 2½ mi. southwest of Iron Mound, Saline Co., May 3, 1930, Hancin 215 (KA); hillton near Manhattan, Riley Co., May 21, 1920, Herr 9 (KA); Manhattan, Riley Co., May 12, Kellerman (KA).

OKLAHOMA: prairie near Tecumseh, April 22, 1932, Barkley 47 (MBG,UO); prairie 2 mi. east of Norman, May 10, 1924, Bruner (USN); Fort Sill, Comanche Co., April 17, 1916, Clemens 11623 (GH); 6 mi. northwest of Stillwater, May 18, 1931, Featherly (MBG); Ripley, July 17, 1931, Featherly (MBG); in open woodlands, southern Okla., near Interstate Bridge, April 11, 1928, Nelson 10816 (MBG).

#### EXCLUDED SPECIES

Baptisia fraxinifolia Nutt. Mss. ex Torr. & Gray, Fl. N. Am. 1: 387. 1840 = Thermopsis fraxinifolia M. A. Curtis, fide Index Kew.

B. Hugeri Small in Bull. Torr. Bot. Club 25: 139. 1896 - Thermopsis mollis (Michx.) M. A. Curt. ex A. Gray in Mem. Am. Acad. N. S. 3: 47, fig. 9. 1848.

B. mollis (Michx.) Nutt. Gen. N. Am. Pl. 1: 281. 1818 = THERMOPSIS FRAXINIFOLIA M. A. Curtis, fide Index Kew.

B. mollis (Michx.) DC. Prodr. 2: 100. 1825 = Thermopsis mollis M. A. Curtis ex Gray, fide Index Kew.

B. nepalensis Hook. Exot. Fl. 2: pl. 131. 1825 = PIPTANTHUS NEPALENSIS Sweet, fide Index Kew.

B. triflora Loudon, Ladies' Fl. Gard. Orn. Perenn. pl. 34. 1843. in Ic. = "RAFNIA TRIFLORA Thunb. in textu. 137."

## DOUBTFUL SPECIES AND NOMINA NUDA

Baptisia retusa Raf. New Fl. N. Am. 2: 47. 1836 [1837].

Efforts to obtain authentic material or information additional to that given in Rafinesque's description were unsuccessful. His description is not sufficiently clear to warrant placing it in any known species with certainty.

Baptisia Lupinoides Burbidge in Gard. Chron. 21: 827. Jan.-June 1884.

This plant was in cultivation in England, and from the description given it is impossible to place it definitely in any recognized species. No authentic material could be located, and reference to it appears no place else in the literature.

Baptisia versicolor Raf. New Fl. N. Am. 4: 107. 1836 [1837], nomen nudum.

### INDEX TO EXSICCATAE

Italicized numerals refer to collectors' numbers, s.n. (sine numero) to unnumbered collections, and parenthetical numerals to the numbers of taxonomic entities.

Abbott, E. K. s.n. (32).
Adams, J. W. 354 (32); 863 (33).
Allen, A. s.n. (32); s.n. (33).
Ammerman, E. s.n. (27).
Amslie, G. C. s.n. (27).
Anderson, E. S. s.n. (15); s.n. (31); s.n. (47).
Anderson, E. S. & L. Hubricht. s.n. (27); s.n. (43); s.n. (44).
Anderson, E. S. & R. Peck. s.n. (27).

Anderson, F. s.n. (33).

Anderson, J. P. s.n. (15); s.n. (27).

Angst, C. E. 1427 (15).

Anthony, R. B. s.n. (27).

Archias, L. H. 3 (15).

Arsène, G. 11851 (27).

Asheroft, G. B. s.n. (32).

Ashe, W. W. s.n. (22); s.n. (46); s.n. (48).

Aughey, S. s.n. (15); s.n. (27).

Babb, M. 120 (47). Babcock, H. H. s.n. (27). Backman, J. s.n. (23). Bailey, -. s.n. (47). Bain, S. M. 401 (27). Baker, -. s.n. (15). Ball, C. R. 546 (12). Ballard, C. A. s.n. (27). Banta, E. 10877 (46). Barbour, W. C. 4 (33). Barce, Barce, & W. Welch. 6126 (15). Barkley, E. D. (Mrs. F. A.) 136 (15); 232 (27); 47 (49). Barkley, F. A. s.n. (15); s.n. (43); s.n. (47). Barkley, Mrs. M. W. s.n. (15). Barnes, C. R. s.n. (43); s.n. (46). Barnhart, J. H. 2186 (5). Bartlett, H. H. 2651 (23). Bartley, F. & L. L. Pontius, s.n. (27). Bartram, E. B. s.n. (23); s.n. (25); s.n. (46). Bartram, E. B. & B. F. Long. s.n. (14). Bassett, F. L. s.n. (15). Bassler, T. s.n. (47). Bates, J. M. 3180 (15); 5847 (32). Bayliss, J. C. s.n. (49). Bebb, M. S. s.n. (15). Beck, J. 26908 (27). Becker, M. s.n. (47). Benke, H. C. 3800-1 (29); 5370 (43). Berkley, E. E. 1240 (30); 1116 (46). Berlandier, J. L. 289 (16); 2554 (19). ex Bernhardi Herb. s.n. (32). Berry, R. E. 45 (47). Berryman, W. s.n. (5). Bessey, C. E. s.n. (27). Bigelow, J. N. s.n. (15). Bigler, s.n. (27). ex Biltmore Herb. 1600a, 1600b, (2); 1595f (11); 14783a (12); s.n. (27); 1597, H-6046 (30); 1262, 1262d (31);

137a (32); s.n. (33); 14778 (43);

Blackmon, G. H. & Enlow. s.n. (11).

Bissell, C. H. 514-42 (33).

Blain, W. L. 238 (20).

Blake, S. F. 10857 (32).

Blakley, O. W. 1428 (12).

136c (46).

Blanchard, F. s.n. (33); s.n. (34); s.n. (46). Blankinship, J. W. s.n. (27); s.n. (47). Blanton, F. S. 6429 (5); 6573 (8); 263 (10); 6387 (30). Blomquist, H. L. 3895 (31); 3893, 3894 (32); 10253 (46); s.n. (48). Bodin, J. E. s. n. (15); s.n. (47). Boettcher, F. L. 137 (33). Bombard, M. L. & A. L. Haas. s.n. (11). Bondy, E. 396 (47). Boott, W. s.n. (32). Boykin, S. s.n. (10); s.n. (22). Brainerd, E. L. s.n. (16). Braun, E. L. s.n. (27); s.n. (32); s.n. (33); s.n. (46). ex Herb. E. L. Braun. s.n. (33). Bray, W. L. 22. (17); s.n. (43). Breakey, E. P. s.n. (15); s.n. (27). Breithaupt, C. F. 9286 (15). Bridge, J. s.n. (16). Bright, J. L. 4779 (5); 2955 (22); 2953 (23); 2594 (31); 15565 (33); 8820 (46). Broadhead, G. C. s.n. (15); s.n. (47). Brown, C. A. 6253, 6267, 6489, 6533 (12); 3956, 5206, 6192, 6272, 6282, 6291, 6345, 6433 (17); 6273, 6276 (19); 2603, 3967, 4088 (27); 5308 (28); 2774 (33); 5809, 6278, 6293 (43). Brownfield, J. 643 (23). Bruner, W. E. s.n. (15); s.n. (49). Buchanan, W. F., Jr. s.n. (9). Buckley, S. B. s.n. (3); s.n. (37); s.n. (47). Bull, Z. R. 110 (15). Burglehaus, F. H. s.n. (33). Burk, M. 301 (15); s.n. (27). Burnham, S. H. s.n. (33). Bush, B. F. s.n., 207, 214, 264 (12); 7, 59, 73, 304, 1115, 14763, 15376, 15386 (15); 2321, 2755, 13304, 13334, 13467 (16); 67 (17); 68 (21); 60, 74, 87, 311, 11854, 15387 (27); 27, 323, 910, 1585, 9358, 15346, 15375, 15505 (47). Butler, Geo. D. s.n. (15); s.n. (20);

s.n. (27); s.n. (42); s.n. (45); 4 (47).

Cain, S. A. 7433 (32).

Camp, S. N. & D. R. s.n. (27); 642 (33).

Camp, W. H. 1281, 1340 (34).

Campbell, —. s.n. (15).

Canby, W. J. s.n. (46).

Canby, W. M. s.n. (2); s.n. (3); s.n. (9); s.n. (22); s.n. (31); s.n. (32); s.n. (33); s.n. (35).

Canby, W. M. & C. H. Sargent. 20 (14); 19 (22).

Canby, W. M., C. H. Sargent & B. F. Bush. 27 (16).

Carleton, M. A. s.n. (15); s.n. (27); s.n. (47).

Chandler, A. 2685 (27); 2684-A, 2684-B (43).

Chapman, A. W. s.n. (1); s.n. (2); s.n. (5); s.n. (6); s.n. (9); s.n., 190 (10); s.n. (14); s.n. (15); s.n. (22); s.n., 792965 (30); s.n. (31); s.n. (41); s.n. (46).

Chase, A. 2492 (33).

Chase, V. H. 107, 4143 (27).

Cheney, L. S. s.n. (15); s.n. (16).

Chickering, J. W. s.n. (46).

Churchill, C. H. 2051, 2052a, 2052b (15); 2054 (27).

Churchill, J. R. s.n. (33).

Clabaugh, N. C. 56 (33).

Clark, O. M. 2821 (15); s.n. (27).

Cleburne, W. s.n. (15); s.n. (27).

Clemens, M. K. (Mrs. J.) 11622 (15); 11623 (49).

Cleveland, -. s.n. (4).

Clokey, I. W. s.n. (27).

Clothier, G. L. s.n. (15).

Clothier, G. L. & H. H. Whitford. s.n. (15); s.n. (27); s.n. (47).

Clover, E. U. 769 (21).

Clute, W. N. 134 (32).

Coberly, E. D. s.n. (27).

Cocks, R. S. 1630, s.n. (12); s.n., 1790a, 1790b (17); s.n. (19); s.n., 1626 (27); 10, s.n. (43).

Coker, W. C. s.n. (25); s.n. (31).

Collins, J. F. s.n. (33).

Cook, F. A. s.n. (12).

Core, E. L. s.n. (32).

Correll, D. S. 691 (32).

Corson, M. s.n. (15).

Cory, V. L. 2174, 22836 (12); 8126 (27); 8131, 22321, 22322, 23114 (43).

Coulter, J. M. s.n. (46).

Cratty, R. I. s.n. (15). Crawford, E. W. 29 (17).

Crocket, J. L. s.n. (12).

Cruikshanks [Crookshanks], D. R. 7 (15).

Cummins, A. s.n. (33).

Curtis, M. A. s.n. (5); s.n. (14); s.n. (22); s.n. (23); s.n. (31); s.n. (32); 1848, s.n. (37).

Curtiss, A. H. 6833 (2); 698, 4828 (5); 699, 5899, 6406 (8); 6840 (9); 689, s.n. (10); 6379 (11); 6810 (24); 697 (30).

Curtiss, C. C. s.n. (32).

Cuthbert, A. 176 (2); 177 (4); 179, s.m. (14); s.m. (23); 180 (30).

Cutler, H. C. s.n., 881 (17); s.n. (27); s.n. (47).

Darlington, -. s.n. (22).

Davis, Rev. J. 1815a, 1815b, 1815c, 9142 (14); 1823, 4401 (15); s.m., 609, 1714, 3151, 3778 (27); s.m., 7805 (32); s.m., 1498 (33).

Davis, J. J. s.n. (15); s.n. (27); s.n. (47).

Deam, C. C. 31562, 31625, 31683, 36708, 40522, 40570, 51926, 53840 (15); 1428, 2344, 6758, 8299, 8902, 9064, 9609, 16256, 20625, 20699, 20766, 21783, 25265, 25787, 25977, 25905, 28464, 31386, 31568, 31648, 31682, 31747, 31838, 39347, 47035, 52673, 58992 (27); s.m., 17971, 39066, 49180, 58993, 58996 (33); s.m., 38811, 58994, 58995 (35); 30167, 38901, 48558, 51592 (46).

Deam, C. C. & N. C. Fassett. 17412 (35).

Deam, Mrs. C. C. 13636 (27).

Deane, W. s.n. (27).

Demaree, D. 11976, 11995 (15); 1206 (16); 12702 (27); 12275 (43); 12282 (47).

Denniston, R. H. s.n. (27). Dewart, P. W. s.n. (16); 101 (27). Dick, W. M. s.n. (32). Diekson, D. & R. S. Coeks. 1791 (12). Diemer, M. E. 1435 (42). Dixon, R. A. 64, 525, 607a (12). Dodd, D. R. s.n. (27). Dodge, C. K. s.n., 6468 (33). Doggett, K. N. s.n. (14). Dolby, S. s.n. (49). Douglass, E. s.n. (16). Drummond, T. s.n. (21); s.n. (43). Drushel, J. s.n. (27); 3302, 6267, 6957 (32).

Eames, A. s.n. (33). Earle, F. S. 3120 (26). Edmondson, C. s.n. (15).

Eggert, H. s.n. (2); s.n. (12); s.n. (15); s.n. (16); s.n. (17); s.n. (18); s.n. (19); s.n. (27); s.n. (32); s.n. (43); s.n. (47).

Eggleston, W. W. 4995 (26); 2565, 2847 (46).

Eggleston, W. W. & J. R. Churchill. s.n. (33).

Ehrlers, J. H. s.n. (27). Elliott, S. s.n. (23); s.n. (32). Emig, W. H. 437 (15). Engberg, C. C. s.n. (15).

Engelmann, G. 1002 (12); s.n. (15); s.n. (27); s.n. (32); 179 (47); s.n. (48). Evermann, B. W. 754 (27).

Fassett, N. C. 16468, 16540, 16541, 16641, 17364, 17790, 17791, 17792, 17793, 17794 (15); 4365, 4367, 16354, 16535, 16536, 16538, 16539, 16648, 16664, 17772, 17783, 17786, 17789 (27); 10610 (32).

Fassett, N. C. & O. A. Bushnell. 16565, 16729 (15); 16573, 16730 (27).

Fassett, N. C. & A. A. Drescher. 14217

Fassett, N. C. & H. P. Hansen. 17368

Fassett, N. C. & F. Hotchkiss. 3436 (15); 3099 (27).

Fassett, N. C. & C. F. McGraw. 17776

Fassett, N. C. & L. R. Wilson, 4366 (15).

Featherly, H. I. s.n. (15); s.n. (49). Featherman, A. s.n. (12).

Fendler, A. s.n. (12).

Fernald, M. L., L. Griscom & B. Long. 4658 (32).

Fernald, M. L. & B. Long. 3972 (33). Fernald, M. L., B. Long & J. M. Fogg. 5319 (32); s.n. (33).

Fernald, M. L., B. Long & R. F. Smart. 5804 (32).

Fernald, M. L., K. M. Wiegand & A. Eames. 14356 (33).

Fernholz, D. L. & S. C. Wadmond. s.n. (15); s.n. (27).

Fieder, M. s.n. (47).

Fielder, M. 59 (15).

Finch, A. 23 (47).

Fink, B. s.n. (15); 578 (27).

Fisher, C. L. s.n., 34104 (12); s.n. (15); 37267 (17); 71 (19); s.n., 335, 3844 (43); 3832 (44).

Fisher, -. s.n. (33).

Fitzpatrick, T. J. & M. F. L. s.n. (15); s.n. (27).

Flint, W. F. s.n. (46).

Floyd, M. F. s.n. (7).

Fogg, J. W., Jr. 5490 (31); 162 (33).

Folsum, T. 65 (15).

Fox, O. O. 27 (27).

Fraser, S. V. 329 (15); 328 (47).

Freeman, O. M. s.n. (47).

Freiberg, G. W. s.n. (27).

Fritchy, J. Q. A. s.n. (27); s.n. (33). Fullmer, E. L. s.n. (27).

Gage, -. s.n. (43).

Gailliard, E. H. & L. M. Bragg. 3672, 3673 (32).

Galen, J. s.n. (33).

Garber, A. P. s.n. (24); s.n. (46).

Garner, F. s.n. (27).

Gates, F. C. s.n., 10861 (27); 17093, 18643 (47).

Gattinger, A. s.n. (46).

Gayle, E. E. 461 (47).

Gershey, A. 356 (33).

ex Herb. L. R. Gibbes. s.n. (14); s.n. (22); s.n. (23); s.n. (31); s.n. (32). Gillett, Q. s.n. (15).

Gilman, -. 803 (5).

ex Herb. N. M. Glatfelter. s.n. (15); s.n. (16); s.n. (27); s.n. (32); s.n. (33).

Gleason, H. A. s.n. (15); s.n. (27). Goodman, G. J. 2359 (12); 2557 (27); 2456, 2583 (47).

Gordon, R. B. & F. B. Chapman. s.n. (27).

Gowan, R. L. s.n., 68 (47).

Graves, E. W. 2114, s.n. (15).
 Gray, A., C. S. Sargent, J. H. Redfield
 & W. M. Canby. s.n. (22).

Greene, B. D. s.n. (33).

Greene, E. L. s.n. (46).

Greenman, J. M. 3888 (15); 4780 (16); 3891, 4786 (27); 185, 458, 2279 (33).

Greenman, J. M., C. E. Kobuski, & E. L. Larsen (Mrs. K. Doak). s.n. (27). Griffith, F. 3493 (47).

Griscom, L. 18393 (10); 21581 (40).

Hagen, A. s.n. (15).

Hale, J. s.n. (12); s.n. (15); s.n., 210 (17); 309 (19); s.n. (27).

Hall, E. s.n. (15); s.n. (17); 160 (43). Haller, W. C. s.n. (15); s.n. (47).

Ham, H. E. s.n. (47).

Hamerstrom, F. W. s.n. (27).

Hancin, J. 156 (15); 178 (47); 215 (49).

Handley, C. O. A-141 (5); A-147 (10).

Hapeman, H. s.n. (15).

Harden, A. s.n. (9).

Harkness, W. F. s.n. (9).

Harper, A. R. s.n. (32).

Harper, R. A. s.n. (15).

Harper, R. M. 802, 1310 (2); 49, 80 (5); 2095 (9); s.m., 3528 (15); 27 (17); 3476 (19); 1315 (32); 3235, 3475 (43).

Harriott, J. T. s.n. (31).

Harvey, F. L. s.n., 7 (15); 16 (27).

Hasse, H. E. s.n. (15); s.n. (27); s.n. (47).

Hayden, F. V. s.n. (12); s.n. (15); s.n. (27).

Heading, H. M. s.n. (9).

Heddle, J. R. 1095, 2504 (15); s.n., 544 (27).

Heller, A. A. 1523 (18). Henderson, J. s.n. (46).

Herr, G. s.n. (15); 9 (49).

Herzer, H. s.n. (46).

Hexamer, A. C. & F. W. Maier. 3.7. (23); s.n. (32).

Hicks, G. H. s.n. (27); s.n. (33). Higginbotham, J. N. s.n. (47).

Hitchcock, A. S. s.n., 356, 357 (5); s.n. (15); s.n. (16); s.n. (27); s.n.

(47). Holm, T. s.n. (32); s.n. (33).

Holzinger, J. M. s.n. (15).

Hooks, Mrs. J. L. s.n. (17); s.n. (37). Hopkins, M. H. 2983, 2984, 2988 (2).

Hotehkiss, H. & P. Jones. 4159 (27). Houghton, H. W. 3800 (12); 3603 (14).

House, H. D. 1862 (14); 3359 (22); 1484 (46).

Howell, A. H. 1165 (10); 779 (14); 644 (27); 6 (47).

Hubricht, L., C. Shoop & D. Heinze. B1451 (47).

Huger, A. M. s.n. (9).

Hull, E. D. s.n. (46).

Hunnewell, F. W. 4694 (34).

Hyams, M. E. s.n. (22); s.n. (31).

Ingraham, R. H. s.n. (33).

Jackson, A. s.n. (47).

Jacobs, A. A. 18 (47).

James, E. s.n. (15).

James, J. F. s.n. (48).

Jeffs, R. E. s.n. (15); s.n. (27); s.n. (47).

Johnston, L. A. s.n. (15); s.n. (47).

Jones, C. H. s.n. (46).

Jones, F. M. s.n. (22); s.n. (33); s.n. (36).

Jones, M. E. s.n. (15); 29325 (21); s.n. (27).

Kearney, T. H. s.n. (9); s.n. (27); s.n., 76 (33); s.n. (46).

Keefe, A. M. s.n. (32). Kellerman, W. A. s.n. (15); s.n. (27); s.n. (33); s.n. (46); s.n. (47); s.n. (49). Kellogg, J. H. s.n. (15); 1798 (17); s.n. (20); s.n., 103, 1799, 15217 (27); 1797, s.n. (47). Kennedy, G. G. s.n. (33). Killian, O. L. s.n. (12). Kineaid, F. & E. West. s.n. (10). Knife, S. W. s.n. (43). Knight, W. C. s.n. (47). Kraus, E. J. s.n. (32); s.n. (33). Kriebel, R. M. 708 (27). Kunz, H. F. 102 (16); 8 (27). Kurz, H. s.n. (1); s.n. (5); s.n. (9).

Langlois, A. B. s.n., 8, 9, 29, (12); s.n. (13); s.n., 4, 5 (17); s.n. (27); s.n. (28); 10, 171 (29); s.n. (38); s.n., 11 (43). Lansing, O. L., Jr. 2586, 2986 (27). Lapham, I. A. s.n. (15); s.n. (27). Larisey, M. M. 4 (16); 1, 2 (27). La Rue, C. D. s.n. (33). Lea, M. C. s.n. (32); s.n. (33). Lea, T. G. 10-1 (46). Leavenworth, M. C. s.n. (15). Le Conte, J. E. s.n. (5); s.n. (9); s.n. (23). Ledman, O. S. s.n. (27). Leeds, A. N. 2559 (9). Lehman, V. s.n. (17). Lehmann, J. G. C. s.n. (47). Leonard, W. H. s.n. (27).

(47).
Lewton, F. L. 73 (17).
Lighthipe, L. H. s.n., 228 (5); 565 (9);
s.n. (32); s.n. (33).
Lindheimer, F. J. s.n., 51 (17); s.n.

Letterman, G. W. s.n. (12); s.n. (15);

s.n. (17); s.n. (27); s.n. (43); s.n.

(43). Lindheimer, F. J. & S. B. Buckley. s.n. (17).

Little, E. L., Jr. 1257 (15); 614, 1251 (27).

Little, E. L., Jr. & C. E. Olmsted. s.n. (27).

Lloyd, F. E. & S. M. Tracy. 251 (27). Lockhart, J. s.n. (47). Lodewyks, M. C. 41, 203 (15); 174 (16); 176, 368 (27). Long, B. N. 25855 (32). Loomis, H. s.n. (23). Loomis, H. & H. B. Croom. s.n. (1). Lownes, J. s.n. (27). Lyman, S. s.n. (33).

Lynn, W. E. s.n. (32); s.n. (48). MacFarlane, J. M. s.n. (22). MacFarlane, J. M. & M. E. Davis, s.n. (22). Mackenzie, K. K. s.n., 13184 (15); s.n. (27); 1558 (32); 844, s.n. (47). Macoun, J. M. 564, 34197 (33). Magee, E. E. s.n. (33). Maguire, B. E3379 (14). Manning, S. s.n. (27); s.n. (32). Manning, W. E. s.n. (15). Martens, J. W. s.n. (33). Martin, B. 7242 (15). Mathews, A. C. s.n. (31). Mathias, M. (Mrs. G. Hassler). 833 (16). Maus, P. M. 51, 843 (15); 113, 848 (27); 13 (47). Maxon, W. R. 3812 (17). Maxwell, F. R. s.n. (15). McAtee, W. L. 3013 (27). McCarthy, G. s.n. (22); s.n. (31); s.n. (32); 53, s.n. (46). McCarthy, C. & J. H. Schuette. s.n.

(33).

McDonald, F. E. s.n. (15).

McGregor, E. A. 25 (14); 656 (23);

162 (32).

McKelvey, S. D. 1743 (21); 2496, 2513
(47).

Mead, S. B. s.n. (27).

Mearns, E. A. 225 (16); 224 (27).

Mell, C. D. 126 (27).

Mellichamp, J. H. s.n. (24).

Meredith, H. B. s.n. (15).

Merner, H. L. 14864 (15).

Merrill, E. D. s.n. (43).

Merrill, F. J. H. s.n. (43); s.n. (47).

Merrill, G. M. 80 (47).

Palm, C. E. 6507 (47).

Mertz, H. N. s.n. (46). Meyer, E. 7844 (17). Miller, G. S. s.n. (46). Miller, -. E3383 (14). Milligan, Mrs. J. M. s.n. (12); s.n. (15); s.n. (16); 9515 (43); 9516 (47). Millspaugh, C. F. 399 (33). Moffatt, W. S. 148, 646 (15); 645 (27). Mohr, C. M. s.n. (8); s.n. (9); s.n. (10); s.n. (11); s.n. (15); s.n. (37). Moldenke, H. N. 1059a, 1061 (5); 1130 (9); 1253, 1179a (22); 1107 (30); 12536 (31); 1220 (32); 1254 Moldenke, H. N. (E. A. Friend). 10432 Monachino, J. 84 (33). Moore, R. H. s.n. (32). Morong, T. s.n. (46). Morrison, J. L. 951 (15); 1093 (27). Mosely, E. L. s.n. (27). Mosier, C. A. s.n. (27). Murphy, C. A. s.n. (15). Myers, I. J. 118 (27). Myers, S. E. s.n. (15); s.n. (47).

Nagle, J. F. s.n. (27).

Nash, G. V. s.n. (33).

Neally, G. C. 71, 73 (12); 69 (43).

Neisler, H. M. s.n. (23).

Nelson, A. 10817 (15).

Nelson, D. (Mrs. A.). s.n. (15); s.n. (47); 10816 (49).

Nieuwland, J. A. 10372 (27); s.n. (32).

Norton, J. B. 997 (27); s.n. (47).

Norton, J. B. & G. L. Clothier. s.n. (27).

Nuttall, T. s.n. (3); s.n. (12); s.n. (15); s.n. (20); s.n. (31); s.n. (47).

Oelmiller, A. s.n. (15).
Olds, G. B. 32 (27).
Olney, S. T. s.n. (33).
O'Neill, H. s.n. (5); 619 (30).
Oosting, H. J. 74 (30); 34111, 34145
(31); 34854, 34631 (33).
Oreutt, C. B. 5963 (21).
Ownbey, M. F. & F. P. s.n. (15).
Oyster, J. H. 25809 (43).

Palmer, E. J. 5213, 7570, 7631, 39303 (12); 39958 (14); 119, 128, 5563. 17928, 24494, 33276 (15); 24547 (16); 5001, 7841, 9072, 33316 (17); 17935 (26); 2464, 9427 (27); 38521 (30); 5046, 9228, 22436, 30463, 30474, 39282 (43); 5525, 24622, 29851 (47); 127 (49). Palmer, E. J. & J. A. Steyermark. 40679 (15); 40269 (27). Pammel, L. H. s.n., 590 (15); s.n. (27). Pammel, L. H. & V. C. Fisk. s.n. (15). Pammel, L. H. & - Zimmerman. 327 (27). Panton, M. H. 12 (15). Parker, C. C. s.n. (27). Parry, C. C. s.n. (15); s.n. (47). Patterson, H. N. s.n. (15); s.n. (27). Penfound, W. T. 1-16 (17). Pennell, F. W. 12082, 11780 (46); 19329 (47). Perkins, A. E. s.n. (23). Perry, R. C. s.n. (32). Petersen, N. F. s.n. (27). Philson, F. J. s.n. (25). Pitcher, Z. s.n. (15); s.n. (27); s.n. (47). Plank, E. N. s.n. (27). Pollock, W. M. s.n. (32); s.n. (33). Pollard, C. L. 501 (46). Polson, L. 14 (15); s.n. (47). Poole, S. F. 75 (47). Popenoe, W. s.n. (27). Porter, T. C. s.n. (22). ex Herb. Porter, T. C. s.n. (26). Potzger, J. E. 2069 (33). Pound, R. s.n. (33). Powell, H. C. 17572 (15). Price, S. F. s.n. (15). Prior, A. s.n. (2). Pyron, J. H. & R. McVaugh. 2457 (2); 2122, 2269, 2270 (9); 2799, 2883 (22); 2153, 2206, 2249 (30); 2690

Randolph, L. F. & F. C. 565 (31); 1067 (33). Rapp, S. 1 (2).

(48).

Ravenel, H. W. s.n. (2); s.n. (3); s.n. (14); s.n. (23); s.n. (32); s.n. (37).
Reade, J. M. E3381 (14); E3371, E3390 (32).

Redfield, J. H. 11701 (22); 1186 (32); s.n. (33).

Reed, H. R. 27556-258 (43).

Rehn, J. A. s.n. (30).

Reverehon, J. s.n., 11, 184, 2652, 2654, 3739, 3740 (12); s.n. (15); s.n. (17); 1985 (27); 2655, s.n., 3738, 4294 (43); 183, 4293 (47).

Reynolds, M. C. s.n. (7); s.n. (9); s.n. (16).

Rice, W. S. & — Rast. E3391 (14).

Rich, W. P. s.n. (33).

Ridgway, R. 909 (15).

Riegel, M. s.n. (14); 29 (26). Riehl, N. 342 (15); 421 (27).

Roberts, T. S. s.n. (27).

Robinson, -. s.n. (27).

Rolfs, P. N. 676 (8); 85, 671 (11).

Rose, J. N. 4192 (17); 4191 (43).

Rosendahl, C. O. 401 (27). Rosendahl, C. O. & F. K. Butters. 3155

(15); 3061 (27).

Rugel, F. s.n. (1); 191 (5); s.n. (10); 190 (14); s.n. (22); s.n. (30); s.n. (32); s.n. (41).

Runyon, R. 1465 (16).

Russell, C. s.n. (27).

Russell, H. L. s.n. (15); 421 (27).

Russell, P. G. s.n. (46).

Ruth, A. s.n. (9); 62, 621 (12); s.n., 2217 (23); 306 (33).

zz17 (23); 306 (33). Rydberg, P. A. s.n. (14); 8000 (31).

Rydberg, P. A. & R. Imler. 65 (27); 579, 676 (47).

Sandberg, J. H. s.n. (27); s.n. (32). Sartweil, H. P. s.n. (27).

Saurman, P. F. s.n. (10).

Schallert, G. J. 8456 (27).

Schallert, P. O. s.n. (27); s.n. (31); 859 (32).

Schrenk, J. s.n. (32).

Schuette, J. H. s.n. (27).

Schulz, E. D. s.n. (33).

Sears, P. B. 1332 (43).

Seymour, F. C. 1237 (32); s.n., 679 (33).

Shafer, J. A. 615, s.n. (46).

Shannon, J. I. 201 (27). Sheldon, —. 17 (43).

Short, C. W. s.n. (46).

Shriver, H. s.n. (46).

Skavlem, H. L. s.n. (27).

Small, J. K. s.n. (2); 10413 (5); s.n. (22); s.n. (24); s.n. (26); s.n. (33); s.n. (37).

Small, J. K. & J. B. De Winkeler. 9085 (5).

Small, J. K., J. B. De Winkeler & C. A. Mosier. 11328 (5); 11181 (30).

Small, J. K., R. M. Harper & H. Gunter. 9671 (1).

Small, J. K., C. A. Mosier & P. A. Matthaus. s.n. (22); s.n. (27).

Small, J. K., J. W. Small & J. B. De Winkeler. 11450 (1); 11453 (5).

Smith, A. H. s.n. (14).

Smith, B. H. s.n. (15).

Smith, H. H. 274 (15); 6804, 7835 (27); 2465, 2544 (32).

Smith, H. L. 115 (27).

Smith, J. D. s.n. (2); s.n., 447 (9); 93 (12); 97 (17); s.n. (22); s.n. (46).

Smith, J. C. s.n. (27).

Smith, L. B. & A. R. Hodgdon. 4197 (15).

Somes, M. P. 3095 (15).

Spence, E. J. s.n. (31).

Sperry, T. s.n. (47). Springer, J. R. s.n. (9).

Spurlock, T. W. s.n. (46).

Stair, L. D. s.n. (33).

Standley, P. C. 9129 (15); 9454 (27); 57413 (32); s.n. (43).

Stanfield, S. W. s.n. (17).

Steele, E. S. s.n. (27); s.n. (33); s.n. (46).

Steele, E. S. & Mrs. E. S. 42 (33).

Steiger, T. L. s.n. (15); s.n. (27).

Steiner, E. 5608 (27).

Steinmetz, F. H. s.n. (33).

Stephens, J. L. s.n. (9); s.n. (24).

Stephenson, 168 (47).

Stevens, G. W. 2762 (15); 74 (16); 455, 547½, 2291 (47).

Stevens, M. E. s.n. (33).

Steyermark, J. A. 933, 13421 (15); 886, 8059, 13213, 13799 (16); 1353, 1471, 14379, 11293, 12825 (27); 993 (32); 1842, 13380, 13422, 10700-a, 24100 (47).

Stone, W. 616 (24). Straub, F. C. 79 (9).

Sudworth, G. B. 131 (32).

Tatnall, R. 3363 (22); 2656 (36). Taylor, Mrs. B. s.n. (27).

Taylor, K. A. s.n. (14); s.n. (22); s.n. (23); s.n. (37).

Taylor, W. R. s.n. (15).

Tees, G. M. s.n. (23).

Tharp, B. C. 5420, s.n. (12); 2295, 3504 (17); s.n., 5963 (18); 4739 (27); 2314, s.n. (43).

Thomas, E. S. s.n. (27).

Tidestrom, I. 11399, 11514, 12254 (33); s.n. (46).

Tisdale, W. B. & E. West. s.n. (22).

Topping, D. L. s.n. (33).

Torrey, J. s.n. (15); s.n. (41).

Totten, H. R. s.n. (30); s.n. (39).

Tower, S. F. s.n. (33). Tracy, S. M. 9100 (8); 3450 (12);

9346 (21). Trelease, W. s.n. (16); s.n. (23); 198

(27); s.n. (47).

True, R. s.n. (22); s.n. (36).

Tyler, E. E. s.n. (15).

Tyler, F. J. s.n. (46); s.n. (47).

Uhler, F. N. & P. A. Warren. s.n. (27).
Umbach, L. M. s.n., 11964 (15); s.n.,
641, 1056, 3500, 3599 (31508), 3717,
11501 (27).

Underwood, J. K. & A. J. Sharp. 3050 (46).

Van Rensselaer, s.n. (27).

Van Vleet, A. H. s.n. (27). Vasey, G. R. s.n. (10); 1182 (27); s.n. (33).

Wallace, C. s.n. (2); s.n. (31); s.n. (32).

Ward, L. F. s.n. (46).

Warner, S. R. 12 (12); 13 (43). Watts, I. B. s.n. (15).

Weatherby, C. A. 6140 (14); 6111 (22). Weatherwax, P. 3205 (46).

Webb, R. J. 584 (33).

Webber, H. J. s.n. (15); s.n., 344 (27).

Weinzirl, J. s.n. (15).

Welch, W. 5858 (15); 5818 (27); s.m. (32).

Weller, S. s.n. (15).

Wellman, F. L. s.n. (15); s.n. (47).

West E en (1): en (2): en (5)

West, E. s.n. (1); s.n. (2); s.n. (5); s.n. (7); s.n. (9).

Whaley, C. 115 (27).

Wheeler, H. E. s.n. (12); s.n. (27). Wheeler, W. A. 1034 (15).

Wherry, E. F. s.n. (14); s.n. (16).

Wherry, E. F. & F. W. Pennell. 13659 (46).

White, M. s.n. (15); s.n. (47).

Whitehouse, E. s.n. (12); s.n. (27).

Wiegand, K. M. s.n. (34).

Wiegand, K. M. & W. H. Manning. 1493, 1494 (31); 1491 (32).

Wild, -. s.n. (46).

Wilkins, H. 1417 (20).

Williams, C. B. 7 (16).

Williams, L. O. & R. 2110 (47).

Williamson, C. S. s.n. (2); s.n. (15); s.n. (24); s.n. (31); s.n. (46).

Williamson, S. M. s.n. (27).

Winter, J. M. 3 (27).

Wislizenus, F. A. 725 (15); 922 (32); 96, s.n. (47).

Wolfe, J. J. s.n. (48).

Wolff, S. E. 1385 (17).

Woodson, R. E., Jr. 324 (15); 253, 740 (27).

Woodson, R. E., Jr. & E. S. Anderson. 1538 (12).

Woodson, R. E. & R. Schery. 115 (5). Wright, C. s.n. (15); s.n. (17); s.n. (43).

W.U.U. Bot. Exp. s.n. (46).

York, H. H. s.n. (18). Young, M. S. s.n. (12).

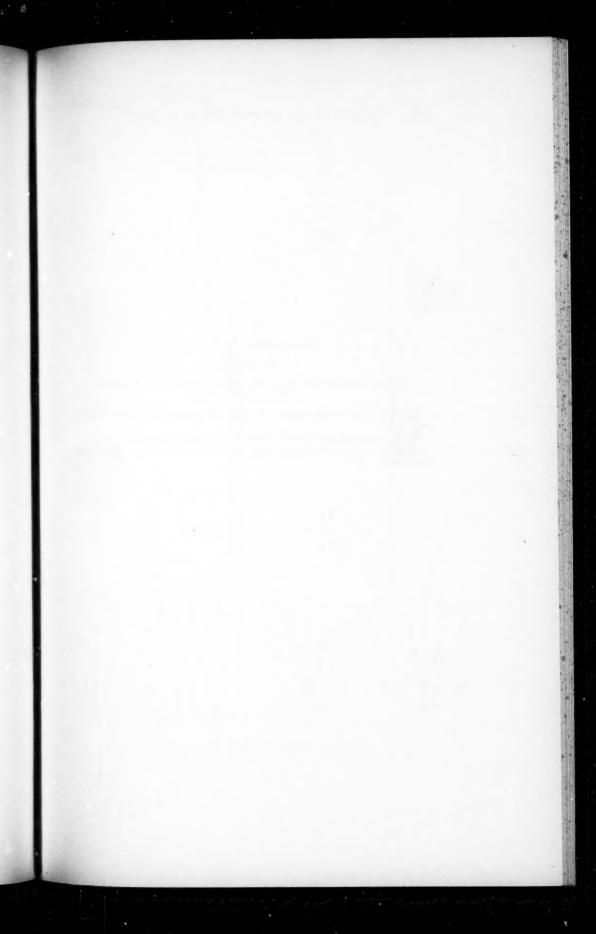
# GENERAL INDEX

Accepted names are in Roman type; synonyms in italics; the principal references and new names in bold face type.

and more	
Page	Page
Baptisia121, 134, 136	leucantha var. pauciflora133, 179
alba122, 132, 137, 167	leucophaea
albescens 169	122, 124, 125, 129, 131, 156
albiflora 167	leucophaea var. glabrescens
australis122, 123, 129, 200	125, 129, 161
australis var. 8	leucophaea var. laevicaulis 125, 162
australis var. minor 203	leucophaea
x bicolor129, 206	lupinoides 208
bracteata122, 124, 125, 154	macilenta
bracteata	megacarpa
Bushii	microphylla125, 132, 142
caerulea	microphylla var. axillaris 142
calveosa	minor119, 122, 123, 129, 203
calycosa var. villosa 146	minor var. aberrans 206
confusa P. & B 151	mollis (Michx.) Nutt 122, 208
confusa Sweet	mollis (Michx.) DC 208
cuneata 164	nepalensis
× Deamii	nuculifera 151
elliptica 149	Nuttalliana119, 131, 133, 151
elliptica var. tomentosa 150	oxyphylla
exaltata	pendula
× fragilis	pendula var. macrophylla172
× fulva	pendula var. obovata128, 171
fraxinifolia	perfoliata122, 126, 132, 141
Gibbesii	perfoliata var. lobata 142
hirsuta	× pinetorum
Hugeri 208	psammophila128, 180
intercalata	retusa 208
× intermedia	riparia
laevicaulis	riparia var. minima128, 193
lanceolata	saligna
lanceolata	Serenae
lanceolata var. β	simplicifolia126, 140
The state of the s	sphaerocarpa 126, 127, 129, 131, 194
lanceolata var. $\gamma$	stipulacea
lanceolata var. texana 151	× stricta
lanceolata var. uniflora 151  Le Contei	× sulphurea129, 199
Le Contei	texana Buckl,124, 151, 203
Le Contei var. B	texana (Holz.) P. & B 151
Le Contei f. robustior 145	tinetoria
leucantha119, 122, 131, 133, 172	tinctoria var. crebra131, 132, 185
leucantha var. divaricata133, 179	tinctoria var. Gibbesii 183

#### ANNALS OF THE MISSOURI BOTANICAL GARDEN

Page	Page
tinetoria var. projecta 188	Piptanthus nepalensis 208
· triflora 208	Podalyria121, 134, 136
uniflora Hook 151	alba Willd 167
uniflora (Michx.) Nutt122, 148	alba Sims
versicolor Raf 208	australis 200
versicolor Lodd 200	
vespertina124, 203	bracteata122, 155
villosa 181	perfoliata 141
villosa	tinctoria 183
viridis126, 129, 131, 196	uniflora121, 148
Crotalaria121, 134, 136, 141	villosa 181
alba121, 167	Rafnia perfoliata 141
perfoliata121, 141	triflora 208
Crotalopsis122, 136	Ripasia122, 136
Eaplosia	oerulea 201
ovata 140	Sophora121, 134, 136, 141
Indigofera 135	alba121, 167
Lasinia122, 136, 148	australis121, 200
bracteata	caerulea 200
cinerea 181	lanceolata121, 148
fulva 181	perfoliata 141
reticulata 148	tinctoria121, 183
Pericaulon	villosa121, 181
cordatum 141	Thermopsis122, 134
microphyllum 142	fraxinifolia 207
perfoliatum 141	mollis 208



# EXPLANATION OF PLATE

### PLATE 16

# SEEDLING STUDIES IN B. AUSTRALIS SHOWING ORIGIN OF LEAVES AND STIPULES

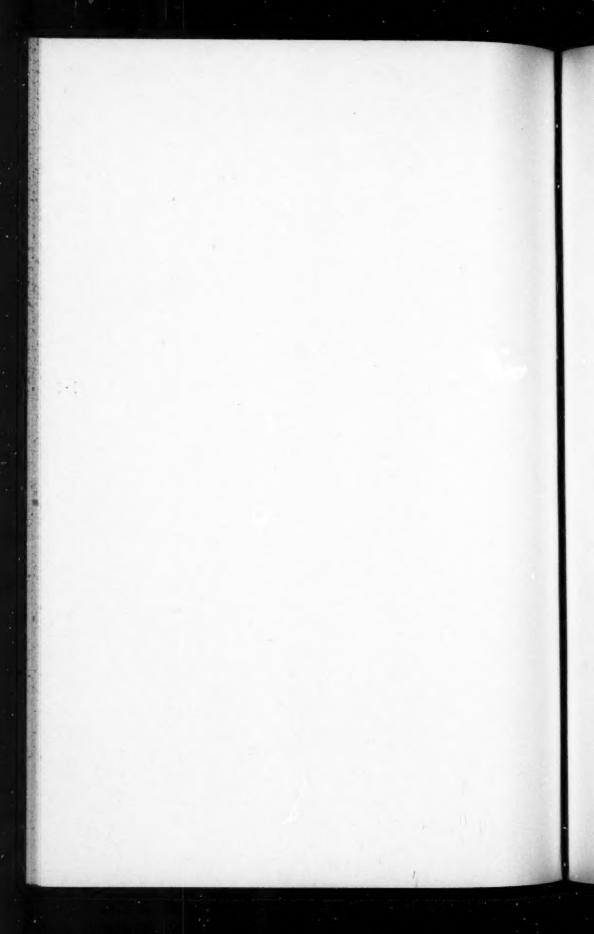
Figs. 1-5. Normal development: no fusion of stipules with primary, unifoliolate leaf.

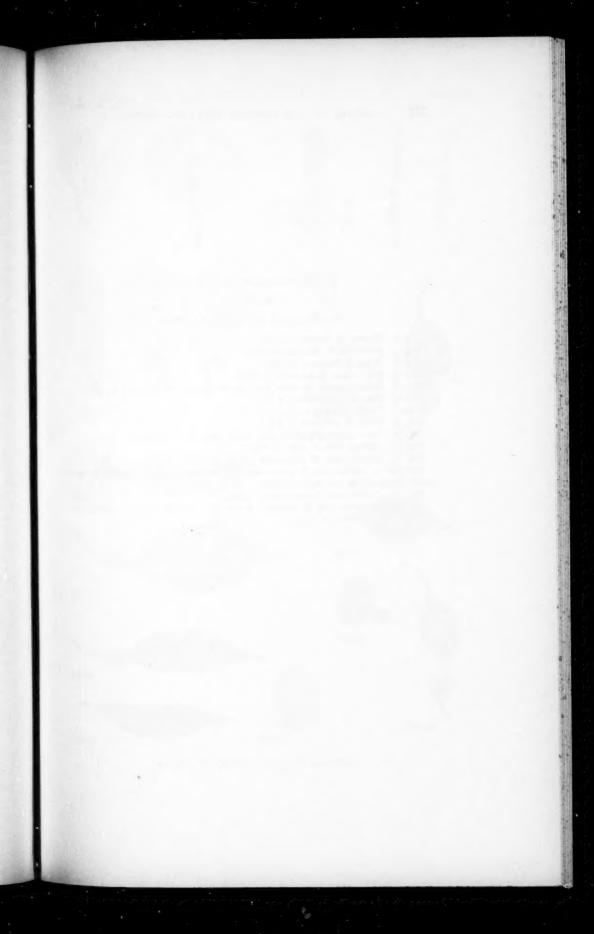
Fig. 6. Abnormal development: fusion of one stipule with primary leaf.

Figs. 7-11. Series illustrating origin of trifoliolate, stipulate leaves from basal scales.



LARISEY-MONOGRAPH OF BAPTISIA





## EXPLANATION OF PLATE

#### PLATE 17

#### FLORAL AND FRUIT CHARACTERS

Fig. 1. Flower, B. tinctoria (x 1%).

Fig. 2. Standard, B. tinctoria (x 21/2).

Fig. 3. Wing, B. tinctoria (x 21/2).

Fig. 4. Keel petals, B. tinctoria (× 31/3).

Fig. 5. Calyx dissected to show insertion of stamens, B. tinctoria (× 21/2).

Fig. 6. Stamen, B. tinctoria (x 3).

Fig. 7. Pistil, B. tinctoria ( $\times$  3).

Fig. 8. Calyx, B. tinctoria (x 1%).

Fig. 9. Calyx dissected to show insertion of pistil, B. perfoliata (× 1%).

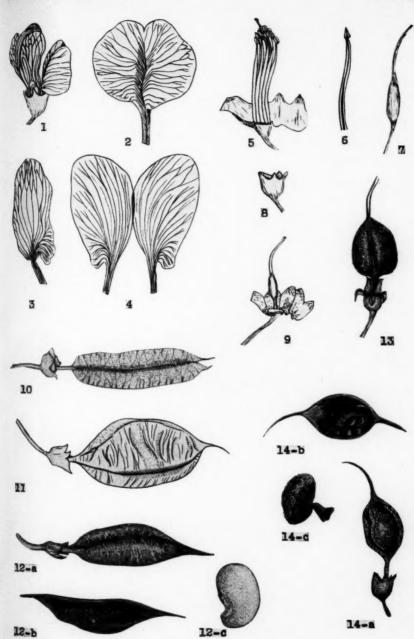
Fig. 10. Mature pod, B. alba (x 1%).

Fig. 11. Mature pod, B. megacarpa (× %).

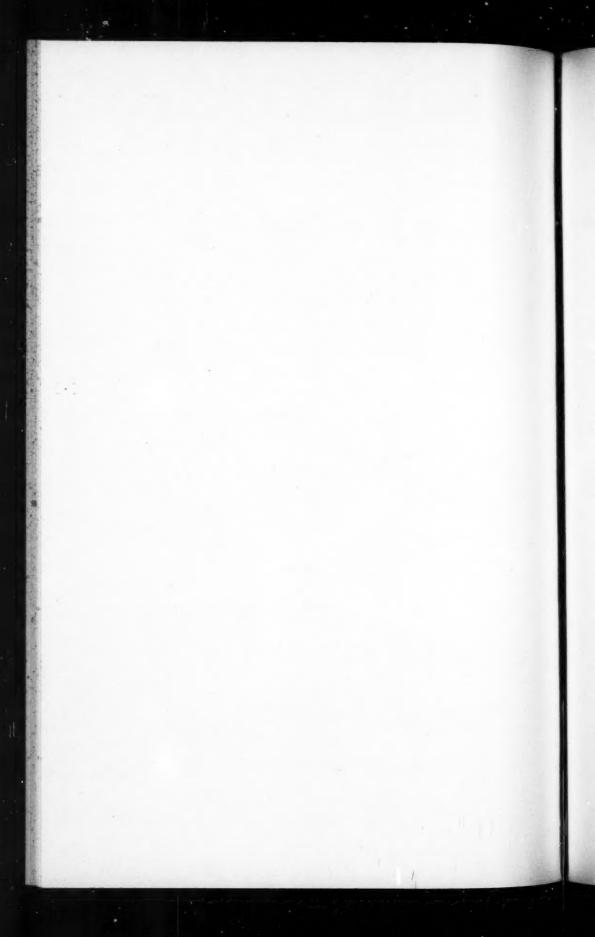
Fig. 12. a. mature pod, B. minor; b. one side removed to show persistent ligneous funicle ( $\times$  %); c. ovule ( $\times$  6%).

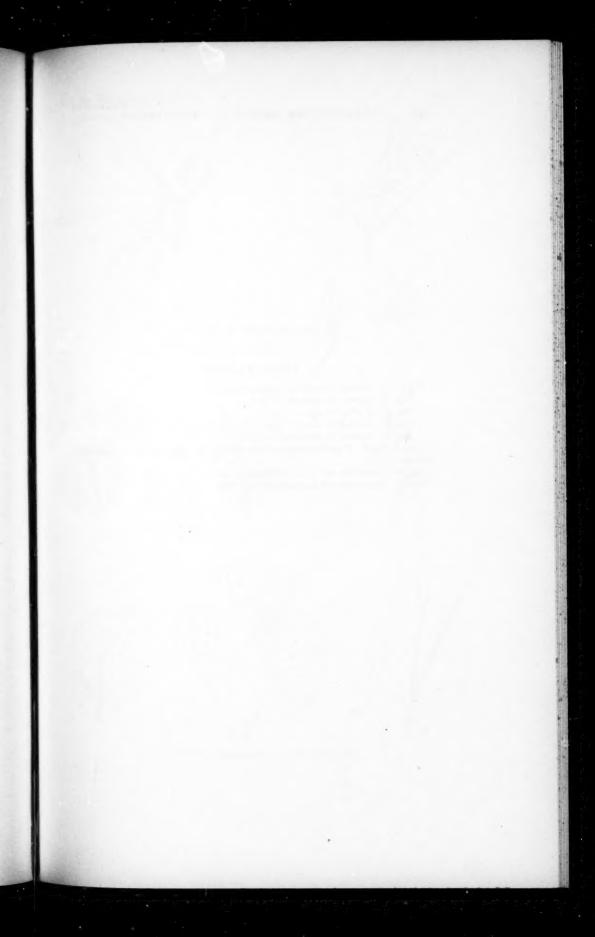
Fig. 13. Mature pod, B. perfoliata (x 1%).

Fig. 14. a. mature pod, B. tinctoria; b. one side removed to show insertion of ovules  $(\times \%)$ ; c. ovule  $(\times 8\%)$ .



LARISEY-MONOGRAPH OF BAPTISIA





#### PLATE 18

#### TYPES OF LEAVES

Figs. 1-4. Ternately compound types of leaves.

Fig. 1. Leaf of B. australis (× %).

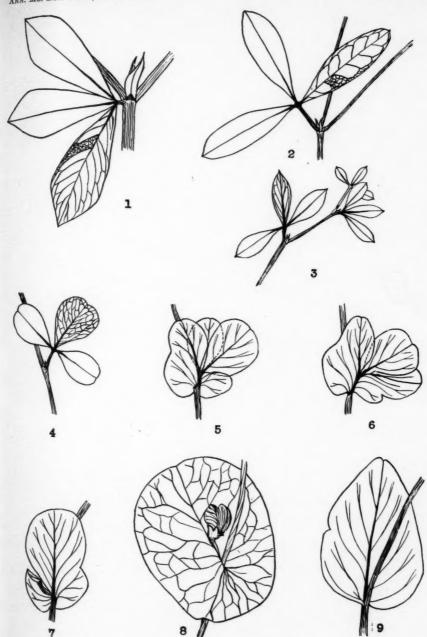
Fig. 2. Leaf of B. alba (× 1%).

Fig. 3. Leaf of B. minor (× %).

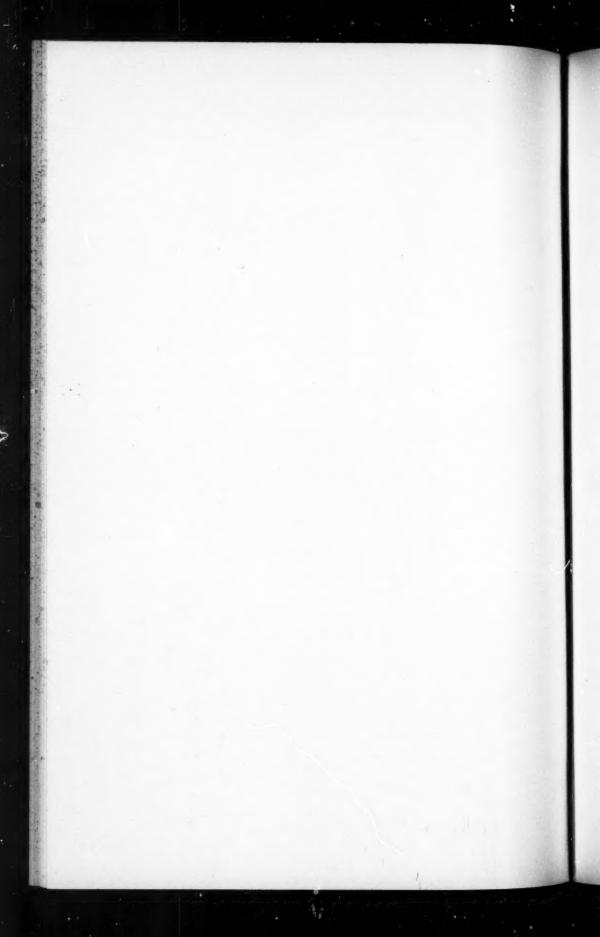
Fig. 4. Leaf of B. tinctoria (× 21/2).

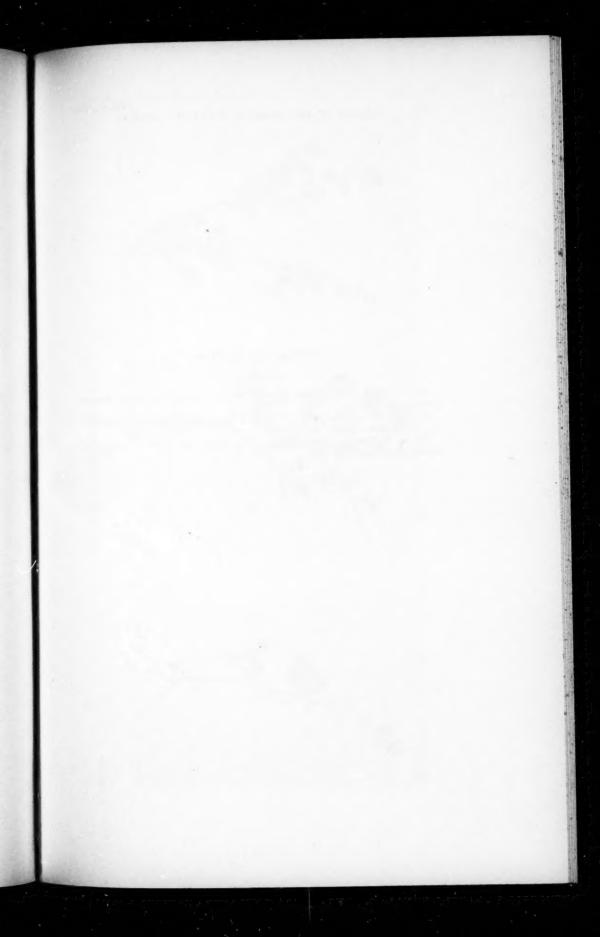
Figs. 5, 6, & 7. Transition stages from compound to simple leaf type in B. microphylla (x %).

Fig. 8. Perfoliate leaf of B. perfoliata ( $\times$  %). Fig. 9. Simple leaf of B. simplicifolia ( $\times$  %).



LARISEY-MONOGRAPH OF BAPTISIA

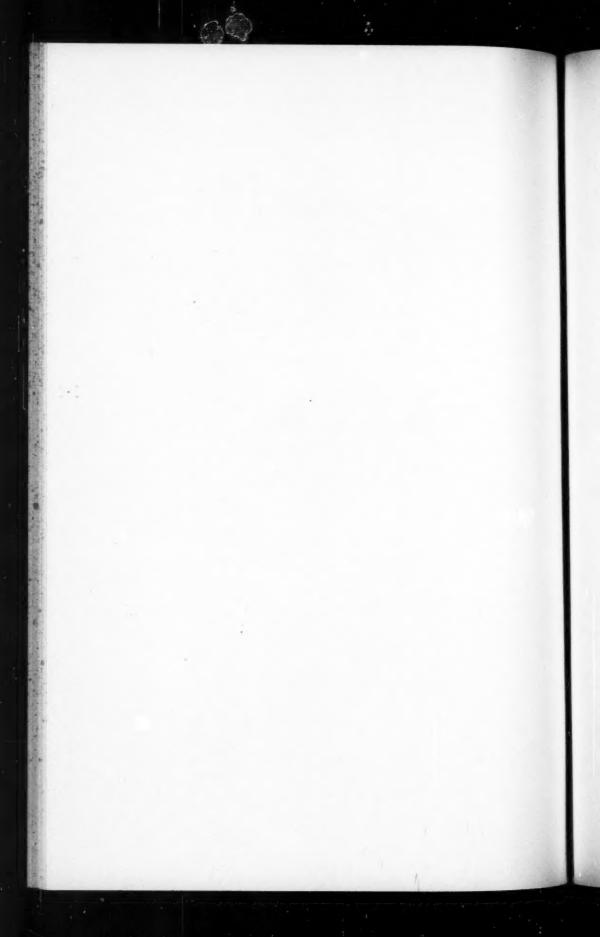


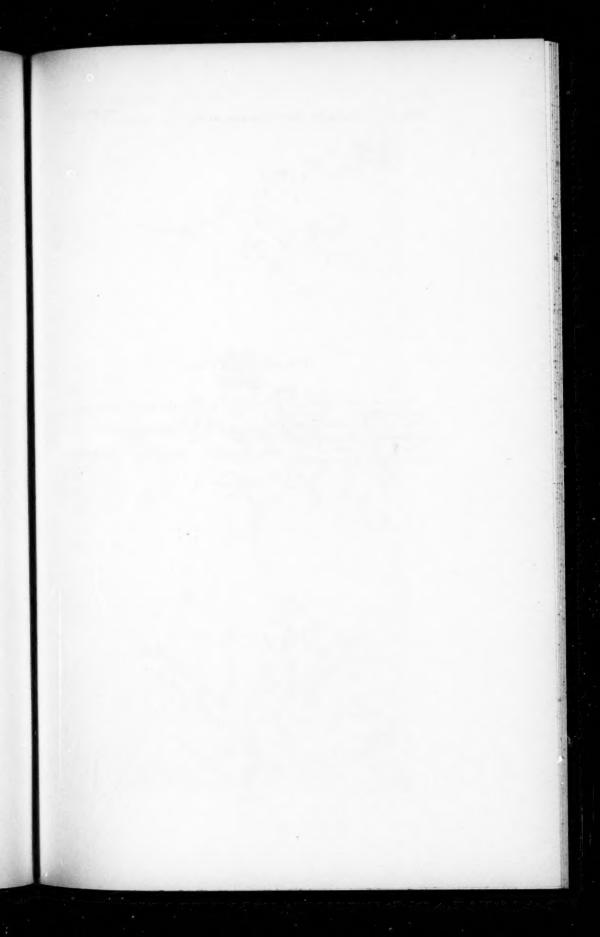


- Fig. 1. B. sphaerocarpa Nutt. From Butler s.n., in Herbarium of the Missouri Botanical Garden.
- Fig. 2.  $\times$  B. sulphurea Engelm. From type specimen, Butler s.n., in Herbarium of the Missouri Botanical Garden.
- Fig. 3. B. leucantha Torr. & Gray. From Butler s.n., in Herbarium of the Missouri Botanical Garden.









### PLATE 20

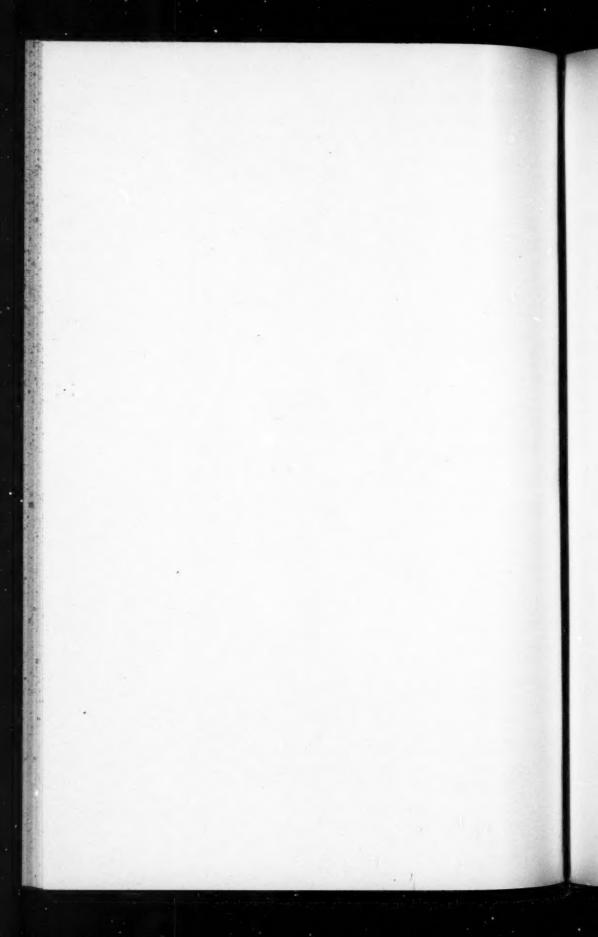
Fig. 1. B. minor Lehm. From Anderson s.n., in Herbarium of the Missouri Botanical Garden.

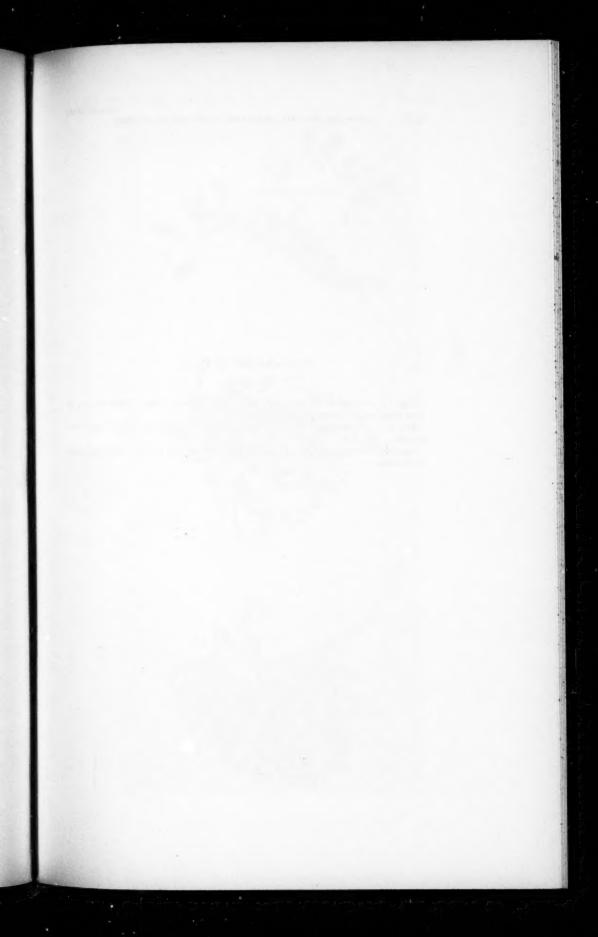
Fig. 2.  $\times$  B. bicolor Greenman & Larisey. From type specimen, Palmer 127, in Herbarium of the Missouri Botanical Garden.

Fig. 3. B. leucophaea Nutt. From Cruikshanks [Crookshanks] 7, in Herbarium of the Missouri Botanical Garden.









### PLATE 21

Fig. 1. B. leucophaea Nutt. var. glabrescens Larisey. From Brainerd s.n., in Herbarium of the Missouri Botanical Garden.

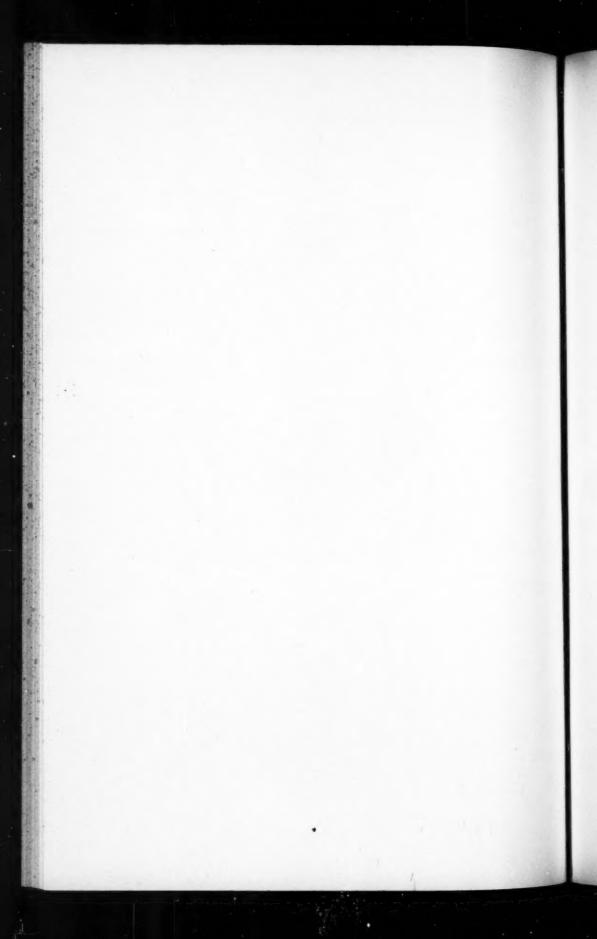
Fig. 2.  $\times$  B. intermedia Larisey. From cotype, Harper 3476, in the Gray Herbarium.

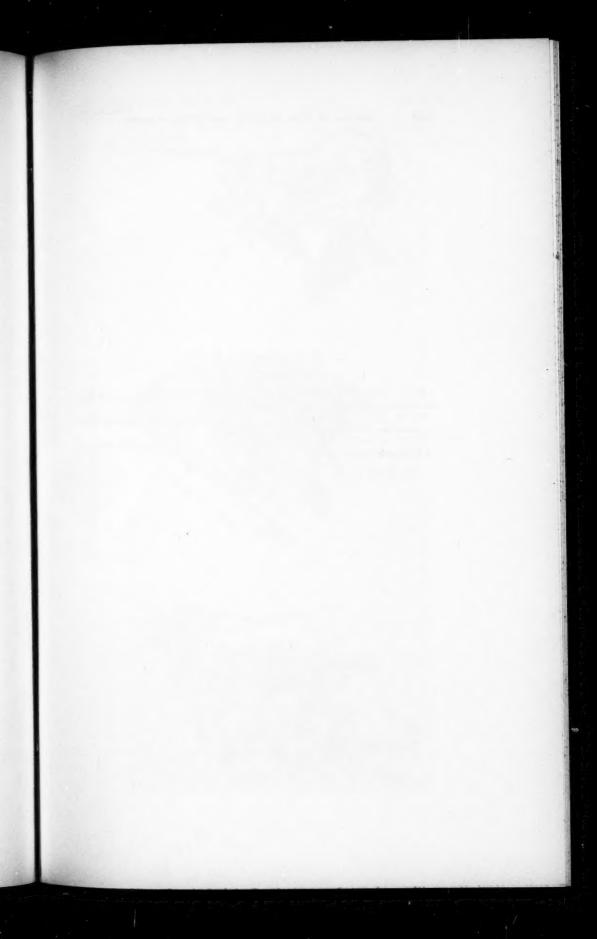
Fig. 3. B. viridis Larisey. From Harper 3475, in the United States National Herbarium.





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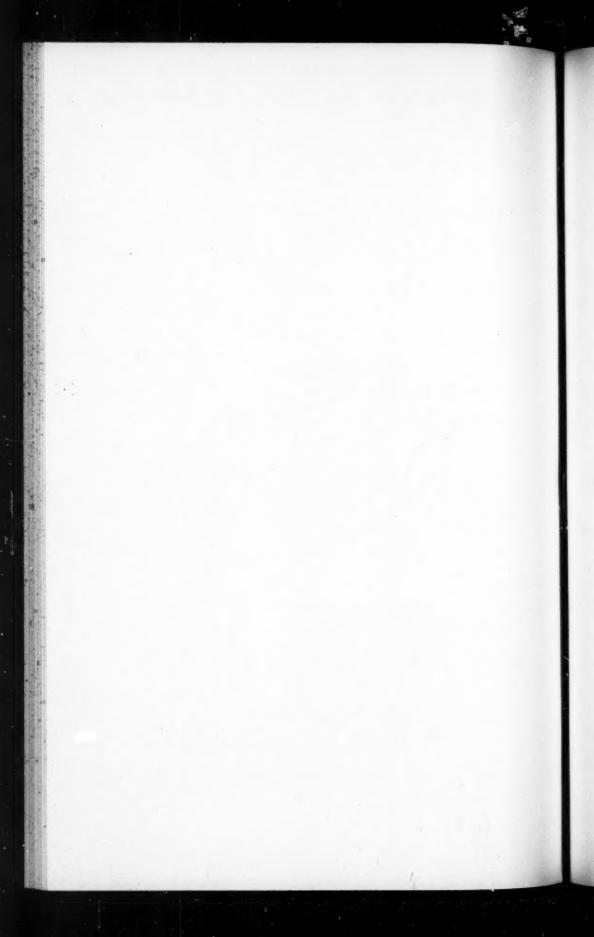


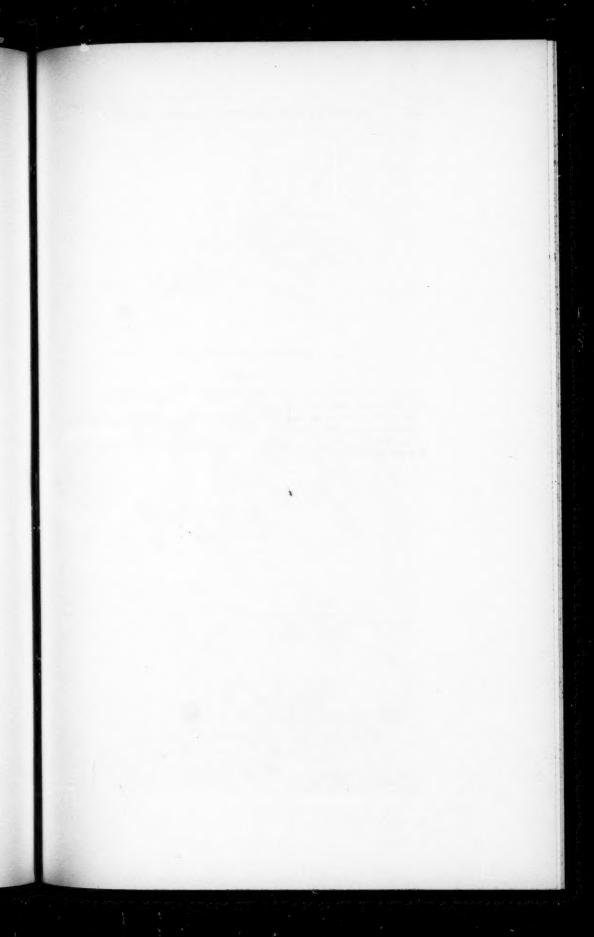
- Fig. 1. B. leucantha Torr. & Gray. From Anderson & Hubricht s.n., in Herbarium of the Missouri Botanical Garden.
- Fig. 2. × B. fragilis Larisey. From type specimen, Anderson & Hubricht s.n., in Herbarium of the Missouri Botanical Garden.
- Fig. 3. B. viridis Larisey. From Anderson & Hubricht s.n., in Herbarium of the Missouri Botanical Garden.



LARISEY-MONOGRAPH OF BAPTISIA

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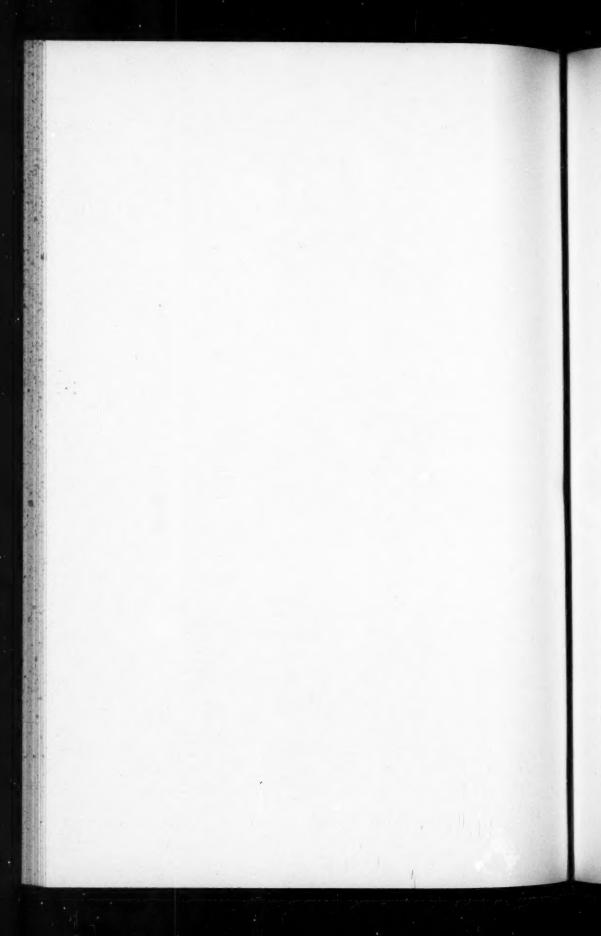


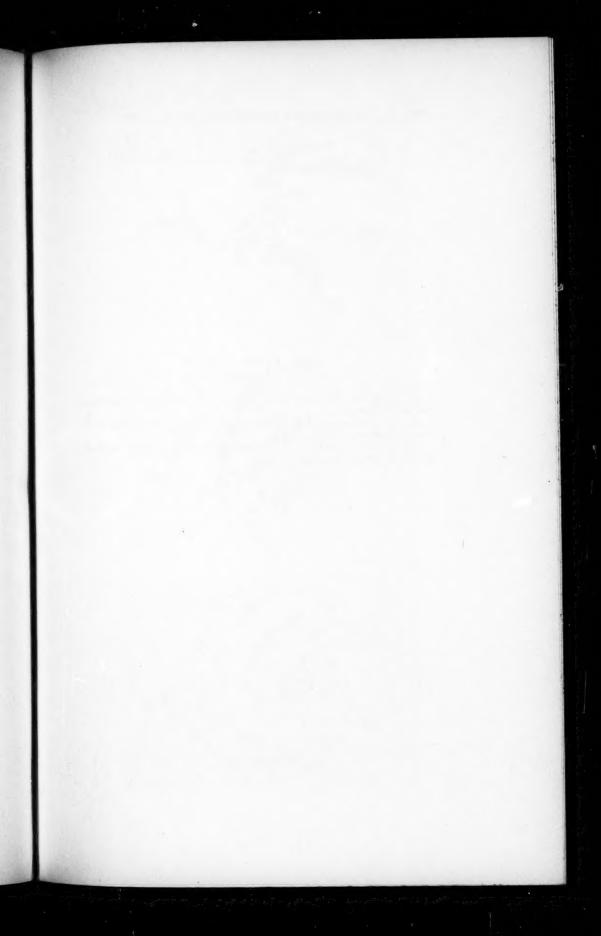


- Fig. 1. B. tinctoria (L.) Vent. var. crebra Fern. From Deam 58,996, in Herbarium of the Missouri Botanical Garden.
- Fig. 2.  $\times$  B. Deamii Larisey. From type specimen, Deam 58,994, in Herbarium of the Missouri Botanical Garden.
- Fig. 3. B. leucantha Torr. & Gray. From Deam 58,992, in Herbarium of the Missouri Botanical Garden.



LARISEY-MONOGRAPH OF BAPTISIA

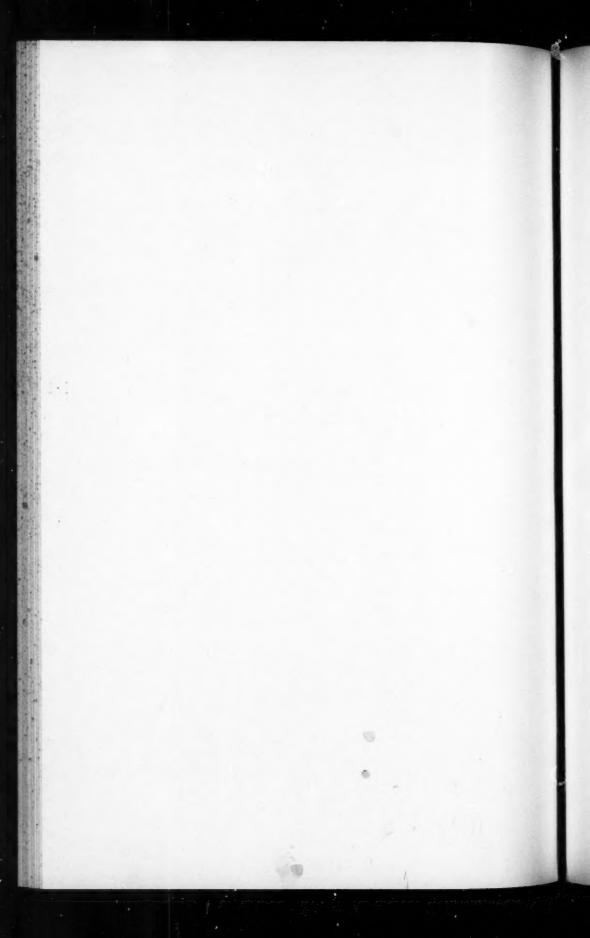


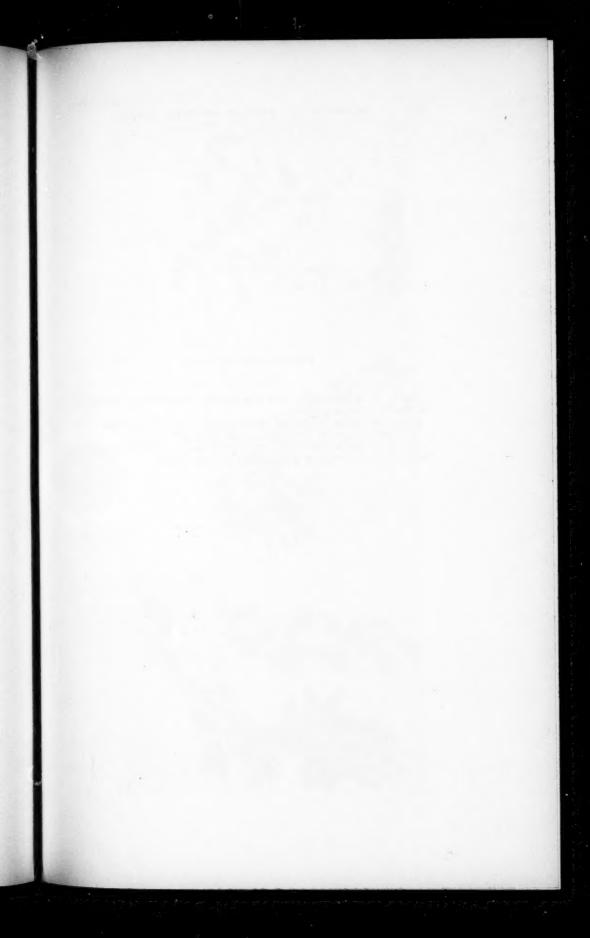


- Fig. 1. B. alba (L.) Vent. From Jones s.n., in Herbarium of the Missouri Botanical Garden.
- Fig. 2.  $\times$  B. pinetorum Larisey. From type specimen, Jones s.n., in Herbarium of the Missouri Botanical Garden.
- Fig. 3. B. tinctoria (L.) Vent. var. crebra Fern. From Jones s.n., in Herbarium of the Missouri Botanical Garden.



LARISEY-MONOGRAPH OF BAPTISIA



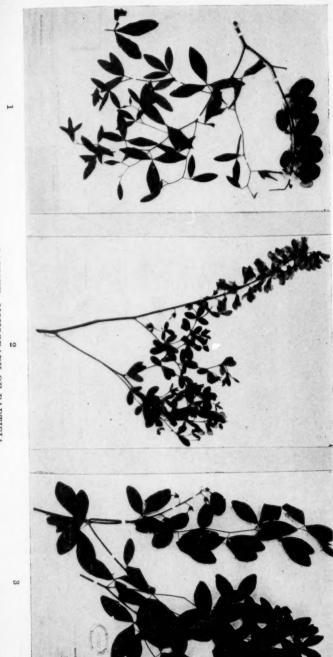


#### PLATE 25

Fig. 1. B. pendula Larisey. From type specimen, Curtiss 6810, in Herbarium of the Missouri Botanical Garden.

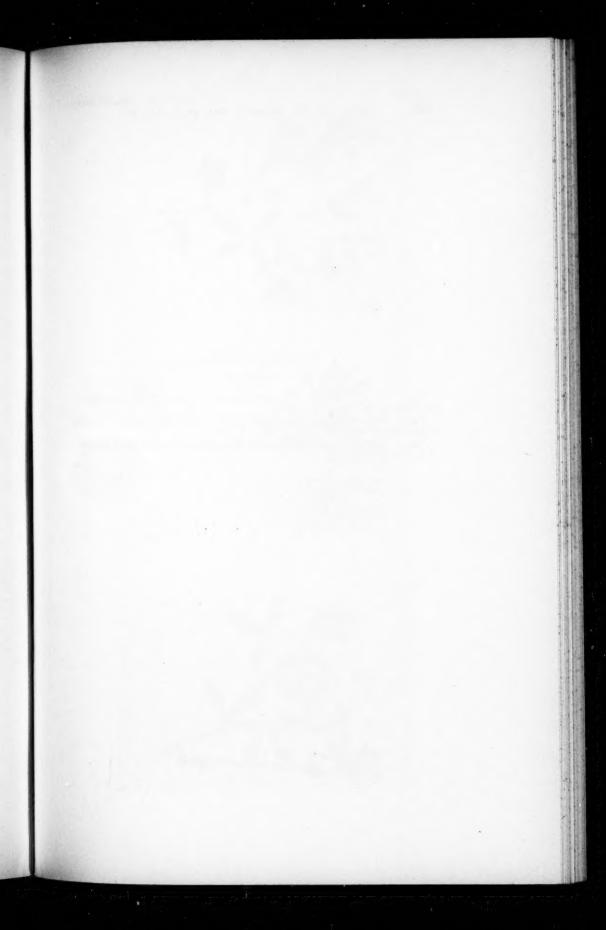
Fig. 2. B. pendula Larisey var. obovata Larisey. From type specimen, Coker s. n., in Herbarium of the University of North Carolina.

Fig. 3. B. pendula Larisey var. mac volvylla Larisey. From type specimen, Palmer 17,935, in Herbarium of the Missouri Botanical Garden.



LARISEY-MONOGRAPH OF BAPTISIA





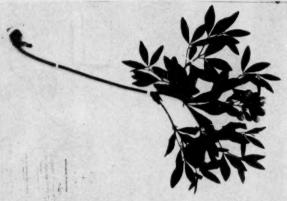
#### PLATE 26

Fig. 1. B. riparia Larisey. From type specimen, Totten s.n., in Herbarium of the University of North Carolina.

Fig. 2. B. riparia Larisey var. minima Larisey. From type specimen, Griscom 21581, in Gray Herbarium.

Fig. 3. B. psammophila Larisey. From type specimen, Biltmore Herb. H/6046, in Gray Herbarium.

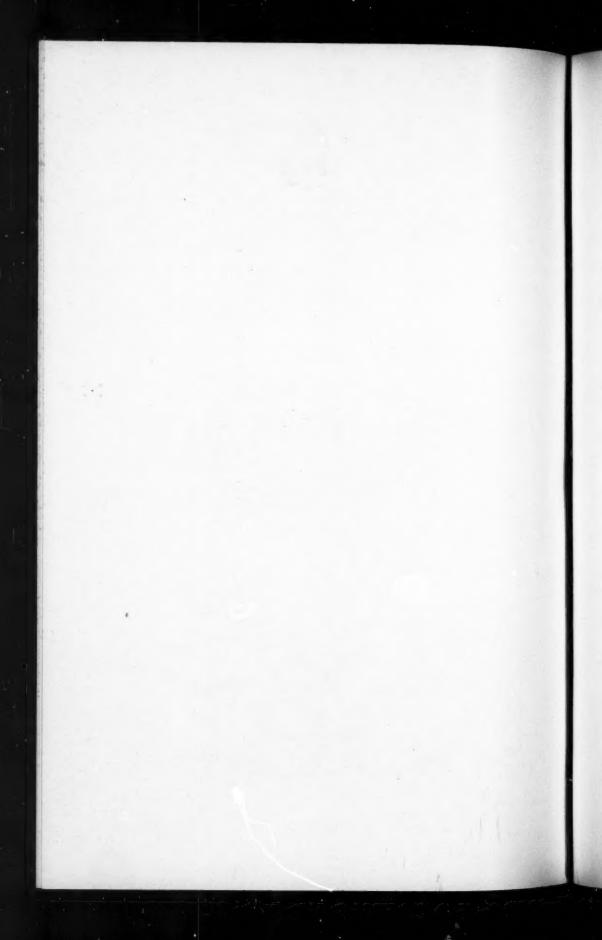


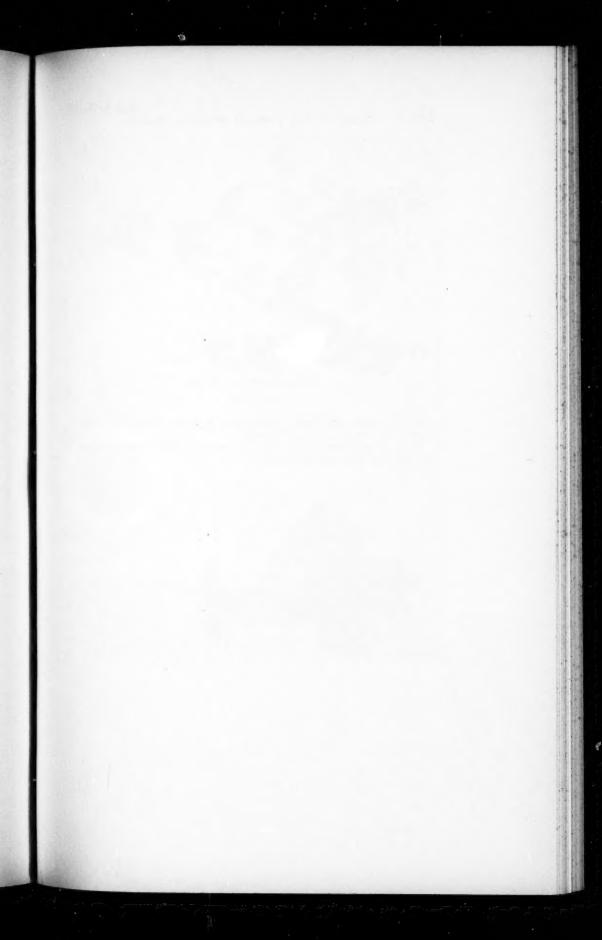




LARISEY-MONOGRAPH OF BAPTISIA

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# EXPLANATION OF PLATE

# PLATE 27

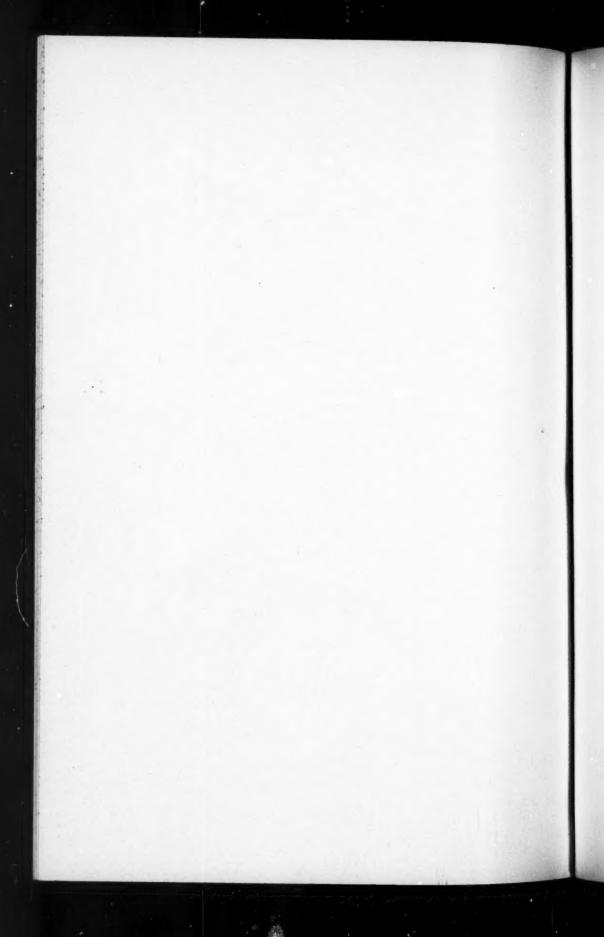
Fig. 1. B. intercalata Larisey. From cotype specimen, Langlois s.n., in Herbarium of the New York Botanical Garden.

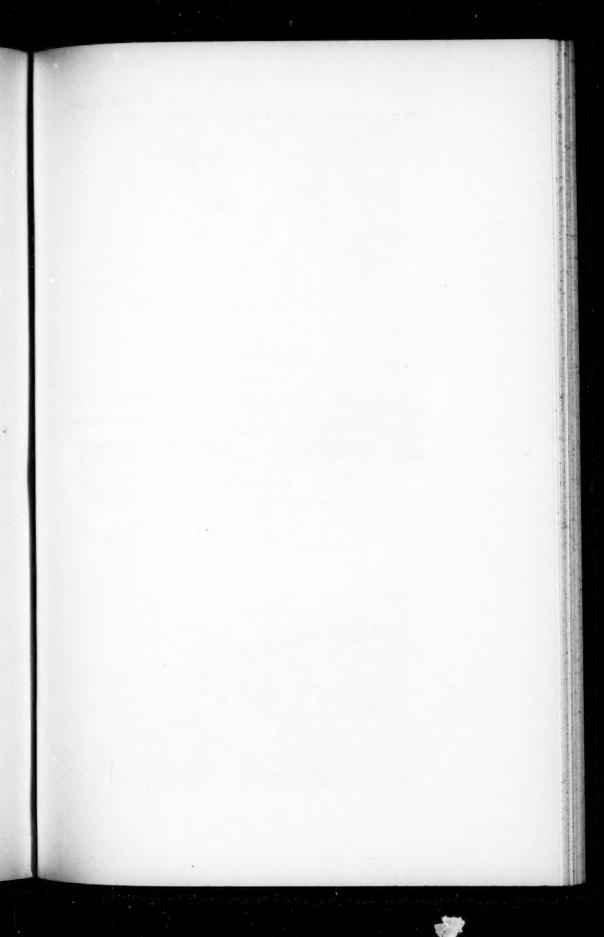
Fig. 2. B. intercalata Larisey. From type specimen, Langlois s.n., in Herbarium of the New York Botanical Garden.

LARISEY-MONOGRAPH OF BAPTISIA



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# EXPLANATION OF PLATE

#### PLATE 28

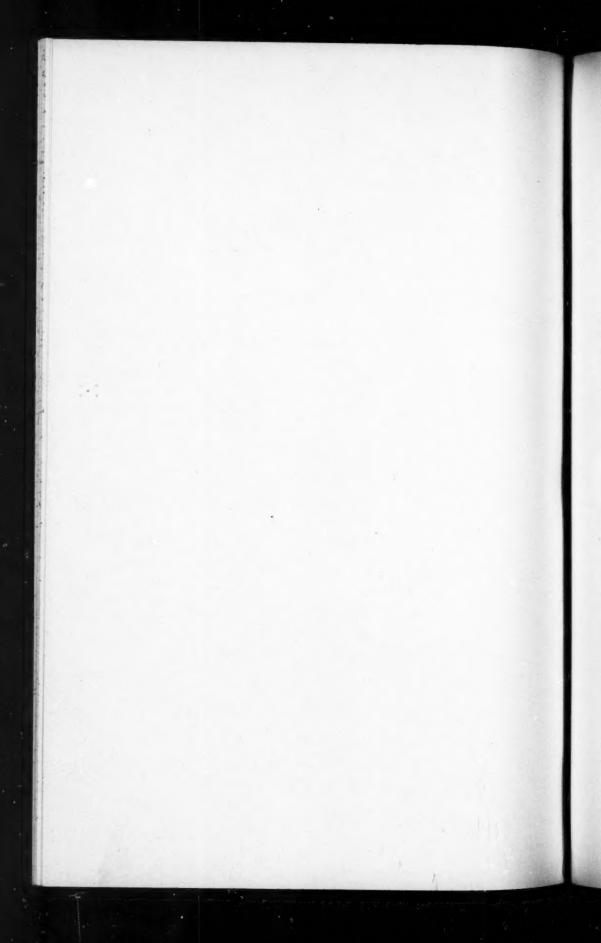
Fig. 1. B. macilenta Small ex Larisey. From type specimen, Langlois s. m., in Herbarium of the New York Botanical Garden.

Fig. 2. B. leucantha Torr. & Gray var. divaricata Larisey. From type specimen, Langlois s. n. in Herbarium of the University of Wisconsin.

Fig. 3. B. leucantha Torr. & Gray var. pauciflora Larisey. From type specimen, Langlois 10, in Herbarium of the New York Botanical Garden.







# A REVISION OF THE NORTH AMERICAN SPECIES OF THE GENUS THERMOPSIS<sup>1</sup>

#### MARY MAXINE LARISEY

Instructor in Botany, Wellesley College
Formerly Instructor in Botany, Henry Shaw School of Botany of
Washington University

#### Introduction

During a monographic treatment of the genus Baptisia, interest was aroused in the state of taxonomic confusion into which its closest generic affinity, Thermopsis, had fallen. According to the "Index Kewensis" and the Gray Herbarium Catalogue, it is comprised of thirty species: eight Asiatic, not considered in this revision; and twenty-two North American—four from the southeastern United States, and eighteen from the western United States. The latter group constitutes a western geographical supplement of Baptisia whose western limits roughly coincide with the eastern limits of Thermopsis.

The problems were found to be largely bibliographical. The present treatment proposes no novelties, but has indicated two new combinations. It consists largely of a drastic reduction of a number of species. The four heretofore recognized southeastern species are reduced to three, and the eighteen western species have been reduced to seven species and five varieties. A key to the species, and brief descriptions with complete citations of synonyms and type or authentic specimens are given.

Relative uniformity, particularly within the western group, makes delimitation of entities difficult in many cases. As in Baptisia, flower structure furnishes little of value in this respect, and has therefore been given little emphasis. Fruit and vegetative characters seem to be the best bases for the separation of species, and have been stressed accordingly. Considerable doubt is felt by the author as to the validity of the two varieties of T. rhombifolia: annulocarpa and arenosa, for they

are frequently difficult to distinguish from the species. Likewise, T. pinetorum and T. divaricarpa are separated on rather weak bases. However, a consideration of geographical distribution substantiates their individuality. All others seem fairly distinct.

Appreciation is expressed to the following institutions through whose cooperation and facilities this work was made possible: The Missouri Botanical Garden, the Gray Herbarium of Harvard University, the New York Botanical Garden, the Academy of Natural Sciences of Philadelphia, the Field Museum of Natural History, Duke University, the University of North Carolina, the University of Colorado, the University of Wyoming, and the University of California.

#### ABBREVIATIONS

MBG—Missouri Botanical Garden.
GH—Gray Herbarium.
ANSP—Academy of Natural Sciences of Philadelphia.
FM—Field Museum.
COL—University of Colorado.
WYO—University of Wyoming.
CAL—University of California.

#### TAXONOMY

Thermopsis R. Br. in Ait. Hort. Kew. ed. 2, 3: 3. 1811. Thermia Nutt. Gen. N. Am. Pl. 1: 282. 1818. Scolobus Raf. in Jour. Phys. 89: 259. 1819. Drepilia Raf. New Fl. N. Am. 2: 52. 1836 [1837].

Perennial herbs with woody rhizomes. Plant usually less than 1 m. high, more or less pubescent throughout. Stem slender or stout, simply branched, branches erect or divaricate, Stipules conspicuous, persistent, frequently foliaceous, ovate-cordate to lanceolate-acuminate, 1–5 cm. long. Petioles 1–4 cm. long. Leaves trifoliolately compound, leaflets linear, elliptic, oblanceolate, or obovate, 3–8 cm. long. Flowers racemose, racemes terminal or axillary, compact or lax, few- to manyflowered. Floral bracts conspicuous, semi-persistent, ovate, cordate to lanceolate, 0.6–1.2 cm. long. Pedicels 1–3 cm. long. Calyx-tube campanulate, bilabiate, upper lip truncate to emar-

ginate, lobes of the lower lip deltoid to lanceolate, usually one-half the length of the tube. Corolla papilionaceous, pale through deep yellow, 1–1.5 cm. in length. Legume sessile or very short-stipitate, usually linear, occasionally elliptic, not inflated, occasionally lomentaceous, straight, recurved, or annular, ascending or divaricate, 5–10 cm. long.

Distribution: North America: southeastern and western

United States. Asia.

#### KEY TO THE SPECIES

1a. Plants of the southeastern United States
1b. Stipules foliaceous
2b. Stipules not foliaceous
1c. Leaflets 2-4 cm. long
2c. Leaflets 5-7 cm. long
2a. Plants of the western United States
1b. Pods divaricate
le. Pods more or less recurved
1d. Plants from North Dakota and Saskatchewan, south to Nebraska and Colorado
1e. Plant sparsely appressed-pubescent
2e. Plant densely silvery-pubescent5. T. rhombifolia var. annulocarpa
3e. Plant glabrate
2d. Plants from Oregon and California
le. Plant sparingly strigose
2e. Plant silvery-canescent
3e. Plant glabrate
2c. Pods virtually straight
2b. Pods ascending
le. Pods glabrate
2c. Pods conspicuously pubescent
1d. Leaflets linear
2d. Leaflets obovate to broadly elliptic
1f. Plant softly pubescent to glabrate
2f. Plant woolly-tomentose
3f. Plant silvery-silky canescent12. T. macrophylla var. velutina

1. T. caroliniana M. A. Curt. in Am. Jour. Sci. I. 44: 80. 1843. Plant 0.8-1 m. high; stem stout, sparingly pubescent to glabrate, erect, simply branched; stipules foliaceous, clasping, broadly ovate, 4-5 cm. long, 2-3 cm. broad; petioles 4-6 cm. long; leaflets obovate, glaucous and finely appressed-pubescent below, 5-8 cm. long, 2.5-4 cm. broad; raceme compact, erect, 1.5-2.5 dm. long; bracts ovate, 3-6 mm. long, caducous; pedi-

cels 2-4 mm. long; calyx-tube silky villous; legume firm, densely villous, straight, appressed to rachis, 4-5 cm. long.

Distribution: North Carolina to Georgia and Tennessee.

CITATION OF SPECIMENS:

NORTH CAROLINA: open woods near Highlands, Macon Co., July 3, 1897, Biltmore Herb. 155b (MBG); Highlands, 1889, Boynton (MBG); in montibus Carolinae et Georgiae, 1842, Buckley (MBG); Haywood Co., Curtis (GH, probable TYPE).
GEORGIA: banks of Tallulah River below Berton P. O., Aug. 18-20, 1893, Small

(MBG).

TENNESSEE: hills around Nashville, Gattinger, Curt. 700 (MBG); Harpeth hills near Nashville, 1875, Gattinger (MBG).

T. mollis (Michx.) M. A. Curt. ex A. Gray in Mem. Am.
 Acad. N. S. 3: 47, fig. 9. 1848.

Podalyria mollis Michx. Fl. Bor. Am. 1: 264. 1803.

Baptisia mollis (Michx.) DC. Prodr. 2: 100. 1825.

Baptisia Hugeri Small in Bull. Torr. Bot. Club 25: 139. 1898.

Thermopsis Hugeri Small, Fl. Southeast. U. S. 596, 1331. 1903.

Plant 3-5 cm. high, softly pubescent throughout; stem diffusely branched, branches slender; stipules varying from ovate to lanceolate, 0.4-1.2 cm. long; petioles 0.5-1.5 cm. long; leaflets broadly elliptic, occasionally ovate, apex acuminate, tawny-pubescent along the veins of the lower surface, 2-4 cm. long, 1-2 cm. broad; racemes compact, flexuous, 0.5-1.5 dm. long; bracts lanceolate, semi-persistent, 0.8-1 cm. long; pedicels 0.5-1 cm. long; calyx minutely pubescent; pods firm, elliptic, appressed-pubescent, divaricate, 3-4 cm. long.

Distribution: Virginia to North Carolina and Georgia.

CITATION OF SPECIMENS:

VIRGINIA: dry ridges near Hampden Sidney College, Prince Edward Co., June 1884, Blair (MBG).

NORTH CAROLINA: no definite locality, Curtis (ANSP, TYPE); no definite locality, Curtis mis. 1842 (MBG); Statesville, Hyams (MBG); no definite locality, Schweinits (ANSP).

GEORGIA: Cornelia, May 1, 1897, Huger (MBG, COTYPE of T. Hugeri Small).

3. T. fraxinifolia (Nutt.) M. A. Curt. in Am. Jour. Sci. I. 44: 81. 1843.

Baptisia mollis (Michx.) Nutt. Gen. N. Am. Pl. 1: 281. 1818.

Baptisia fraxinifolia Nutt. Mss. ex Torr. & Gray, Fl. N. Am. 1: 387. 1840.

Plant 4–6 dm. high, lightly appressed-pubescent throughout; stem occasionally glabrate, branched, branches geniculate, slender; stipules lanceolate, 0.8–1 cm. long, persistent; petioles 1.5–2.5 cm. long; leaflets obovate-elliptic, lower surface pubescent along the veins, 5–7 cm. long, 2–3 cm. broad; racemes loose, flexuous, 1–2 dm. long; bracts ovate-cordate, 0.5–1.5 cm. long, semi-persistent; pedicels 0.5–1.2 cm. long; calyx glabrate; pods linear, delicate, minutely pubescent, recurved, divaricate, 7–8 cm. long.

Distribution: North Carolina to Georgia and Tennessee.

CITATION OF SPECIMENS:

NORTH CAROLINA: southeastern North Carolina, Ashe (MBG); Pilot Mtn., July 1895, Ashe (MBG); rich, shady slopes, Biltmore, May 1 & 10, 1896, Biltmore Herb. 1025 (MBG); in montibus Carolinae et Georgiae, 1842, Buckley (MBG); no definite locality, 1842, Curtis (MBG); in vicinity of Table Rock Mtn., Aug. 2, 1890, Heller (MBG); Asheville, June 1925, Kraus (MBG); no definite locality, Nuttall (ANSP,TYPE of B. fraxinifolia Nutt.); dry soil, Black Mtns., Sept. 4, 1931, Sharp (MBG).

TENNESSEE: Lookout Mtn., May 1869, Canby (MBG).

4. T. rhombifolia Nutt. ex Richards. in Frankl. Narr. First Journ. App. 737. 1823.

Cytisus rhombifolius Nutt. in Fras. Cat. 1813; Pursh, Fl. Am. Sept. Suppl. 2: 741. 1814.

Thermia rhombifolia Nutt. Gen. N. Am. Pl. 1: 282. 1818.

Plant 2-4 dm. high, appressed-pubescent throughout; stem slender, firm, geniculate, sparingly branched; stipules ovate-cordate, 0.5-1 cm. long; petioles 0.5-1 cm. long; leaflets obovate-cuneate to elliptic or oblanceolate, 2-3 cm. long, 1-2 cm. broad; racemes loose, usually less than 1 dm. long; bracts lanceolate, 5-7 mm. long, usually caducous; calyx-tube usually somewhat villous; pods silky villous, lomentaceous, recurved to annular, divaricate, 4-6 cm. long.

Distribution: North Dakota and Alberta, south to Nebraska and Colorado.

CITATION OF SPECIMENS:

NORTH DAKOTA: clay soil near top of butte, Medora, June 1, 1912, Bergman (MBG); sandy bluffs, Bismarck, May 1891, Lanterman (MBG).

SOUTH DAKOTA: hilltop near Lead, June 24, 1928, Lee (MBG); eroded banks and ravines, Bad Lands, near Wall, Pennington Co., June 15, 1929, Palmer 37290 (MBG); open rocky woods near Lead, Lawrence Co., June 17, 1929; Palmer 37352 (MBG); foothills, Black Hills, Rapid City, June 30, 1909, White (MBG).

NEBRASKA: sandy banks of Missouri, Fort Pierre, June 1853, Hayden (MBG); river bottoms above Council Bluffs, June 10, 1853, Hayden (MBG); Frankl. Exp., Hooker (ANSP); common in dry washes and slopes, Sioux Co., May-June 1927, Kramer 52 (MBG); no definite locality, Nuttall (ANSP, TYPE).

SASKATCHEWAN: open hillside, Lupton, May 11, Clokey 1800 (MBG); Estevan, June 22, 1907, Cowles 18 (MBG).

ALBERTA: prairie and stubble, Craigmyle district, May 25, 1922, Brinkman (MBG); dry gravelly soil, Red Deer Valley, vicinity of Rosedale, May 10, 1915, Moodie 860 (MBG).

MONTANA: Custer, 1890, Blankinship 22 (MBG); Westby, June 17, 1927, Larsen 20 (MBG).

WYOMING: disintegrated rocks, Ridge, Albany Co., June 18, 1901, Goodding 38 (MBG); slate slides, Alcova, Natrona Co., June 29, 1901, Goodding 151 (MBG); Table Mtn., June 2, 1894, Nelson 121 & 122 (MBG); open stony ridges, Arlington, July 10, 1924, Nelson 10145 (MBG); shale soil 8 mi. northwest of Hulett, Crock Co., June 6, 1935, Ownbey 646 (MBG); dry soil, Telephone Canyon, Laramie Hills, Albany Co., May 30, 1936, Ownbey 1027 (MBG); dry slopes, Bates Hole, June 20, 1926, Payson & Payson 4760 (MBG); dry hillsides 6 mi. west of Keycee, Johnson Co., April 27, 1934, Rollins 413 (MBG); plains at base of Cheyenne Mtn., May 4, 1891, Smith (MBG); dry plains, Carbon Co., May 27, 1932, Williams 397 (MBG); in gravel, Telephone Canyon, east of Laramie, Albany Co., June 18, 1935, Williams 2218 (MBG); pine forest, South Fork of Clear Creek, Johnson Co., June 26, 1936, Williams & Williams 3117a (MBG).

COLORADO: Canyon City, May 1871, Brandegee 19 & 22 (MBG); infrequent on sandstone rock 5 mi. east of Boulder, April 30, 1921, Hanson C41 (MBG); Platteville, April 17, 1908, Johnston 462 (MBG); Fern Lake Trail, Estes Park, June 20, 1929, Mathias 408 (MBG); Manitou, May 15, 1892, Mulford (MBG); on plains 2 mi. north of Simla, Elbert Co., June 23, 1937, Ownbey 1296 (MBG); Mt. Pass, July 1, 1886, Trelease (MBG); Gregory Cañon, Boulder Co., May 21, 1912, Vestal 568 (MBG).

- 5. T. rhombifolia var. annulocarpa (Nels.) L. Wms. in Ann. Mo. Bot. Gard. 23: 450. 1936.
- T. annulocarpa A. Nels. in Bull. Torr. Bot. Club 26: 239. 1899.

As the species except somewhat more densely silvery-pubescent throughout, and pods usually completely annular.

Distribution: Wyoming.

CITATION OF SPECIMENS:

WYOMING: along roadsides, Bills' Flat, Big Horn Co., July 25, 1901, Goodding 353 (MBG); among rocks on naked slopes near summits of Ferris Mtns., July 25, 1898, Nelson 4971 (WYO,TYPE of T. annulocarpa Nels.); in clay and sandy ravines,

Fort Steele, Carbon Co., June 16, 1900, Nelson 7252 (MBG); barren slopes above snow bank, Bates Hole, June 20, 1926, Payson & Payson 4799 (MBG); in pine forest on South Fork of Clear Creek, Johnson Co., June 26, 1936, Williams & Williams 3117 (MBG).

# 6. T. rhombifolia var. arenosa (Nels.) Larisey, comb. nov.

T. arenosa A. Nels. in Bot. Gaz. 25: 276, pl. 18. fig. 4. 1898. As the species except somewhat larger in general habit and tending to become glabrate.

Distribution: Wyoming.

CITATION OF SPECIMENS:

WYOMING: Laramie Hills, July 17, 1897, Nelson 3182a (WYO,TYPE of T. arenosa Nels.); sandy washes, Laramie Hills, June 1906, Nelson (MBG); sandy soil, foot of Telephone Canyon, Laramie Mtns., Albany Co., June 8, 1933, Porter 1891 & 1829 (MBG).

### 7. T. divaricarpa A. Nels. in Bot. Gaz. 25: 275. 1898.

Plant 4-6 dm. high, softly pubescent to glabrate throughout; stem slender, firm, branched; stipules ovate-lanceolate, 1.5-2.5 cm. long; petioles 1-2 cm. long; leaflets oblanceolate-elliptic, 3-4 cm. long, 1-2 cm. broad; racemes loose, erect, 1-2 dm. long; bracts ovate-lanceolate, 8-10 mm. long, usually caducous; pedicels 4-6 cm. long; calyx-tube softly pubescent to glabrate; pods lomentaceous, softly pubescent to glabrate, usually straight, or only slightly recurved, divaricate, 4-7 cm. long.

Distribution: Wyoming and Colorado.

#### CITATION OF SPECIMENS:

WYOMING: rocky bars near Little Laramie River, Albany Co., June 15, 1901, Goodding 10 (MBG); stream bank near Centennial, Albany Co., June 24, 1929, Goodman 632 (MBG); Telephone Canyon, Pole Creek, Medicine Bow Mtns., July 16, 1925, Hanna 96 (MBG); J. Johnson's ranch, Aug. 8, 1897, Nelson 3905 (WYO, Type); along banks, Sand Creek, Albany Co., June 2, 1900, Nelson 7031 (MBG); creek banks, Mandel, Albany Co., July 24, 1903, Nelson 1910 (MBG); edge of thickets, Fish Creek, Albany Co., July 4, 1917, Nelson 9784 (MBG); moist creek bottom, Crow Creek, Laramie Hills, Albany Co., July 11, 1935, Rollins 977 (MBG); dry hillside among sage-brush near Crow Creek, Laramie Mtns., Albany Co., June 20, 1935, Williams 2236 (MBG).

Colorado: Breckenridge, Rocky Mtns., 1871, Brandegee 279 (MBG); Brookvale, Clear Creek Co., June 11, 1918, Churchill (MBG); Ward, July 7, 1906, Daniels 109 (MBG); Clear Creek Valley, Idaho Springs, Aug. 2, 1874, Engelmann (MBG); slopes, Anita Peak, Routt Co., Aug. 3, 1903, Goodding 1779 (MBG); common 10 mi. west of Boulder on dry slopes near Boulder Falls, July 5, 1920, Hanson c375 (MBG); Boulder, Aug. 21, 1884, Letterman (MBG); near Breckenridge, Summit Co., Aug. 1901, Mackenzie 256 (MBG); near houses, Wagon Wheel Gap Exp. Sta-

tion, Mineral Co., June 3, 1900, Murdoch 4524 (MBG); moist mountain meadows, Trails' End, Aug. 26, 1923, Nelson 10019 (MBG); wet creek banks, Salida, May 18, 1925, Nelson 10495 (MBG); stream banks, Idaho Springs, Sept. 3, 1928, Nelson 10948 (MBG); dry slopes, Tolland, July 4, 1923, Overholts, Roberts & Shope 140 (MBG); Idaho Springs, July 20, 1884, Smith (ANSP); Lyons, May 23, 1892, Smith (MBG); Manitou Park, July 7, 1891, Trelease (MBG); Golden, June 30, 1933, Zobel (MBG).

# 8. T. pinetorum Greene, Pittonia 4: 138. 1900.

T. pauciflora Thornber ined.

Plant 3-4 dm. high, sparsely pubescent to glabrate; stem slender, firm, branched; stipules broadly lanceolate, 1.5-3.5 cm. long, lowermost frequently longer than the leaflets; petioles 1.5-3 cm. long; leaflets broadly oblanceolate to elliptic, glabrous above, sparsely appressed-pubescent below, 4-5 cm. long, 1.5-3 cm. broad; racemes loose, few-flowered, usually less than 1 dm. long; bracts ovate-cordate, semi-persistent; pedicels 5-10 mm. long; calyx silky-villous; pods straight, ascending, glabrate, 4-6 cm. long.

Distribution: Colorado to New Mexico, Utah, and Arizona.

CITATION OF SPECIMENS:

COLORADO: Flat Top Mtn., Estes Park, Aug. 14, 1933, Allen 3 (MBG); Larimer Co., May 10, 1895, Baker (MBG); Los Pinos (Bayfield), May 23, 1899, Baker 442 (fl.) (MBG,WYO,part of TYPE, CAL,ND); Marshall Pass, July 19, 1901, Baker 485 (fr.) (MBG,FM,WYO,CAL,ND,part of TYPE); Chicken Creek, La Plata Mtns., July 6, 1898, Baker, Earle & Tracy 350 (MBG); dry soil, Mount Vernon Cañon, Jefferson Co., June 20, 1921, Bethel & Cloky 4186 (MBG); Estes Park, Aug. 14, 1933, Burton (MBG); meadow, Fremont Ranger Station, Rio Grande Nat. Forest, Mineral Co., May 27, 1911, Murdoch 4519 (MBG); dry hillsides, Tolland, June 25, 1913, Overholts (MBG); Ward, 1908, Pace 296 (MBG); aspen groves, Uncompangre Divide, W. Montrose Co., July 3, 1924, Payson & Payson 3898 (MBG); Denver, May 23, 1892, Smith (MBG).

NEW MEXICO: Solitario, vicinity of Las Vegas, July 9, 1926, Arséne 17863 (MBG); canyon, vicinity of Santa Fe, July 31, 1926, Arséne & Benedict 16925 (MBG); Balsam Park, Sandia Mtns., May-June 1915, Ellis 40 (MBG); base of mountains in Santa Fe Creek Valley 5 mi. above town, May 1847, Fendler 185 (MBG); along Pecos River 8 mi. east of Glorietta, San Miguel Co., June 9, 1897, Heller & Heller 3681 (MBG); in Mogollon Mtns. near west fork of Gila River,

Socorro Co., Aug. 23, 1903, Metcalfe 593 (MBG).

ARIZONA: Chiricahua Mtns., Barfoot Park, north slope, Aug. 19, 1907, Blumer 1590 (MBG); Matzatzal Mtns., Gila Co., Collom 286 (MBG); Chiricahua Mtns., Rustlers' Park, June 18-19, 1930, Goodman & Hitchcock 1162 (MBG); yellow pines, Flagstaff, Aug. 4, 1922, Hanson A81 (MBG); Baker's Butte, June 2, 1890, Jones (MBG); Flagstaff, June 1883, Rusby 551 (MBG); stony creek banks, Flagstaff, April 21, 1925, Nelson 10200 (MBG); Oak Creek Canyon, May 24, 1935, Nelson & Nelson 2108 (MBG).

UTAH: gravel, Silver Reef, May 4, 1894, Jones 5158 (MBG); Elk Ridge, west ridge, San Juan Co., June 23, 1932, Maguire & Redd 1918 (MBG); near timberline, La Sal Mtns., Grand Co., July 22, 1924, Payson & Payson 3957 (MBG); moist shaded locations in canyon, Geyser Basin, San Juan Co., July 19, 1912, Walker 315 (MBG).

- 9. T. montana Nutt. ex Torr. & Gray, Fl. N. Am. 1: 388. 1840.
  - T. fabacea (Pall.) DC. ex Hooker, Fl. Bor. Am. 1: 128. 1838.
  - T. angustata Greene, Pl. Baker. 3: 34. 1901.
  - T. stricta Greene, Pl. Baker. 3: 34. 1901.

Plant 6-8 dm. high, slightly villous to glabrate in parts; stem stout, succulent, sparingly branched, branches ascending; stipules linear-lanceolate, ascending, 2-3 cm. long; petioles 1-3 cm. long; leaves ascending, leaflets linear to linear-lanceolate, converging, 3-8 cm. long; racemes compact, erect, 1-2 dm. long, bracts lanceolate, 0.8-1.2 cm. long, semi-persistent; pedicels 4-6 mm. long; calyx-tube silky villous; pods villous, straight, erect, closely appressed to rachis, 5-7 cm. long.

Distribution: Montana south to Colorado, west to Oregon and Nevada.

#### CITATION OF SPECIMENS:

MONTANA: frequent, low ground, Bozeman, June 28, 1899, Blankinship (MBG); low ground, Belgrade, June 2, 1906, Blankinship 681 (MBG); Sheridan, June 1895, Fitch (MBG); East Gallatin Swamps, July 24, 1896, Flodman 614 (MBG); meadow, Armsted, Beaverhead Co., June 20, 1920, Payson & Payson 1734 (MBG).

WYOMING: river bottoms, Henry's Fork, Uintah Mtss., June 26, 1902, Goodding 1192 (MBG); meadows, Slater, Colo.-Wyo. line, Carbon Co., July 31, 1903, Goodding 1733 (MBG); moist, grassy bottom-land along Ham's Fork, Granger, June 11, 1931, Hanna 735 (MBG); moist peat in meadow of grasses and sedges, Lonetree, Uintah Co., June 21, 1934, Harrison & Larsen 7915 (MBG); moist grassy places, Fort Bridger, June 27, 1926, Heller 13949 (MBG); among willows and cottonwoods, Evanston, Uintah Co., June 14, 1900, Nelson 7216 (MBG); wet river lands, Baggs, July 4, 1926, Nelson 10720 (MBG); Laramie, June 28, 1899, Pannel 57 (MBG); in wet swales, hills east of Lyman, June 8, 1932, Rollins 147 (MBG).

COLORADO: Fort Collins, May 15, 1896, Baker (MBG); Sapinero, June 19, 1901, Baker 173 (fl.) (MBG,WYO,CAL,ND,part of TYPE of T. stricta Greene); Gunnison, July 24, 1901, Baker 604 (fr.) (MBG,WYO,CAL,ND,part of TYPE of T. stricta Greene); clearing, Everett Lake, Lake Co., July 5, 1919, Clokey 3588 (MBG); no definite locality, 1871, Greene (MBG); low wet grassy banks of White River, 2 mi. east of Meeker, Rio Blanco Co., Aug. 18, 1935, Maguire & Piranian 12844 (MBG); rocky mountain slopes between Corona Station and Tolland, Gilpin Co., June 24, 1926, Palmer 31258 (MBG); river bottom, Naturita, May 20, 1914, Payson 330 (MBG); Canyon City, 1888, Wislisenus 843 (MBG).

IDAHO: Bear Lake, Aug. 8, 1898, Mulford 280 (MBG); wet sandy banks, Devil Creek, Owyhee Co., June 27, 1912, Nelson & Macbride 1742 (MBG).

UTAH: Kimballs, vicinity of Salt Lake City, June 3, 1908, Clemens (MBG); north slope of Abajo Mtns., July 1-2, 1930, Goodman & Hitchcock 1389 (MBG); damp meadow near Bear River, Summit Co., Aug. 10, 1931, Greenman & Greenman 4680 (MBG); Fish Lake, Aug. 10, 1927, Harris c27572 (MBG); deep shade of aspen grove, Ashley Forest, Duchesne Co., June 13, 1934, Harrison & Larsen 7628 (MBG); dry rocky hillside, Carter Creek, Daggett Co., June 19, 1934, Harrison & Larsen 7883 (MBG); grassy bank of Sheep Creek at Manila Rd., Daggett Co., July 11, 1933, Hermann 4728 (MBG); edge of aspens in wet meadow, Goodman ranch, Bear River Valley, Summit Co., Aug. 9, 1933, Hermann 5764 (MBG); Heyrum, May 15, 1898, Mulford 44 (MBG); in woods, shady banks of Bear River, Uintah Mtns., July 26-Aug. 7, 1902, Pammel & Blackwood 4113 (MBG); Fish Lake, July 9, 1875, Ward 344 (MBG); Sheep Creek Canyon, vicinity of Flaming Gorge, Daggett Co., May 29, 1932, Williams 432 (MBG).

NEVADA: vicinity of Current, Nye Co., May 1916, Bentley (MBG); Star Valley, foothills of Ruby Mtns., July 20, 1896, Greene (ND,TYPE of T. angustata Greene); Star Canyon southeast of Deeth, Elko Co., July 10, 1912, Heller 10575 (MBG); Wells, June 22, 1930, Jones 25461 (MBG); Eureka, Eureka Co., July 2, 1904, Kennedy 838 (MBG); North Fork, Humboldt River, Elko Co., Aug. 6, 1913, Kennedy 4474 (MBG); sandy river banks, Mountain City, Aug. 13, 1912, Nelson & Macbride 2200 (MBG); Camp Hallick, 1876, Palmer (MBG).

OREGON: moist sunny bottoms of South Fork, John Day, Prairie City, Grant Co., June 5 & 17, 1925, Henderson 5384 (MBG); Canyon City, May 20, 1885, Howell (MBG); dry woods, summit of Blue Mtns., near Meacham, Umatilla Co., May 10, 1928, Gale 254 (MBG).

EXACT LOCALITY UNKNOWN: Rocky Mountains, Nuttall (ANSP, TYPE).

10. T. ovata (Rob.) Rydb. in Bull. Torr. Bot. Club 40: 43. 1913.

T. montana subsp. ovata Rob. in Contr. U. S. Nat. Herb. 2: 349, 1906.

T. xulorrhiza Nels. in Bot. Gaz. 52: 265, 1911.

Plant 6-8 dm. high, softly pubescent to glabrate throughout; stem stout, succulent, sparingly branched; stipules foliaceous, obovate to ovate-cordate, 2-4 cm. long; petioles 2-4 cm. long; leaflets obovate to broadly elliptic, 6-8 cm. long, 2-4 cm. broad; racemes loose, 2-3.5 dm. long; bracts foliaceous, ovate-cordate, 1-1.5 cm. long; calyx-tube villous; pods silky-villous, ascending, usually but not always closely appressed to the rachis. 5-7 cm. long.

Distribution: Wyoming west to Washington, and Oregon.

CITATION OF SPECIMENS:

WYOMING: Evanston, July 28, 1897, Nelson 3863 (MBG).

IDAHO: forest, Nez Perces Co., Aug. 1896, Brown (MBG); grassy ditch, arid transition ½ mi. southeast of Lapwai, Nez Perces Co., May 3, 1935, Constance, Clark, Dillon, Machlis & Rollins (MBG); sandy bank of Middle Fork Clearwater River, at mouth of Squaw Creek, 3 mi. below Lowell, Canadian Zone, Nez Perces National Forest, Idaho Co., May 30, 1936, Constance & Rollins 1621 (MBG); Latah Co., 1896, Elmer 365 (MBG); Cedar Mtns., Latah Co., July 1899, Elmer 1635 (MBG); near Lewiston, Nez Perces Co., May 7, 1896, Heller & Heller 3035 (MBG); Indian Valley, July 13, 1899, Jones 6222 (MBG); shady loam slopes, Falks' Store, Canyon Co., May 24, 1910, Macbride 39 (MBG,WYO,CAL,TYPE of T. xylorrhisa Nels.); moist loamy flats, Falks' Store, Canyon Co., May 10, 1911, Macbride 800 (MBG); natural meadow lands, Squaw Creek (Sweet), May 9, 1911, Macbride 845 (MBG); Latah Co., June 16, 1893 (June 21, 1894), Piper 1439 (MBG,FM,TYPE); sandy shores, valley of Hatwai Creek, Nez Perces Co., April 28, 1892, Sandberg, MacDougal & Heller 68 (MBG).

WASE TO TON: light shade of lodgepole forest 4 mi. north of Table Rock, Blue Mtns., Columbia Co., July 20, 1935, Constance, Clarke, Staats & Van Vleet (MBG); Oxford Prairie, Chehalis Co., June 12, 1897, Lamb 1197 (MBG, ANSP, FM, CAL); roadsides north of Hoquiam, Grays Harbor Co., May 9, 1931, Thompson 6238 (MBG); roadside near Humptulips, Grays Harbor Co., July 10, 1931, Thompson

7842 (MBG).

OREGON: moist situations, eastern Ore., June 24, 1899, Cusick 2205 (MBG); Summit, June 1, 1892, Mulford (MBG); open woods near summit of Blue Mtn., between Pendleton and La Grande, June 14, 1928, Thompson 4725 (MBG); damp field south of Imbler, Union Co., June 15, 1928, Thompson 4830a (MBG); wooded slopes of Sexton Mtn., Josephine Co., April 9, 1934, Thompson 10209 (MBG).

- T. macrophylla Hook. & Arn. Bot. Beech. Voy. 329. 1840;
   Torr. & Gray, Fl. N. Am. 1: 388. 1840;
   Torr. in Pac. Rail. Rept. 4: 81. 1856.
- T. fabacea (Pall.) DC. ex Torr. Bot. Mex. Bound. Surv. 58. 1856.
  - T. californica S. Wats. in Proc. Am. Acad. 11: 126. 1876.

T. robusta Howell in Erythea 1: 109. 1893.

Plant 4-6 dm. high, woolly-tomentose throughout; stem stout, diffusely branched, branches ascending; stipules foliaceous, ovate-cordate, 2-3.5 cm. long; petioles 1.5-2.5 cm. long; leaflets obovate-cuneate to oblanceolate or occasionally elliptic, 4-7 cm. long, 3-4 cm. broad; racemes loose or compact, straight, erect, 1.5-2.5 dm. long; bracts ovate-cordate, 0.5-1 cm. long, semi-persistent; pedicels 4-6 mm. long; calyx appressed-pubescent; pods densely appressed-pubescent, erect, 6-8 cm. long.

Distribution: Oregon and upper California.

CITATION OF SPECIMENS:

OREGON: Coast Mtns., Curry Co., June 1884, Howell 75 (GH); Coast Mtns., 40th

parallel, June 8, 1884, Howell (FM).

California: in moist grassy places in open hills, Crystal Springs Lake, San Mateo Co., May 1, 1902, Baker 685 (MBG); Knoxville, Napa Co., May 8, 1903, Baker 3081 (MBG); Pac. R.R. Exp., 1853—4, Bigelow (ANSP); dry hillsides, Coast Range, San Rafael, May 1865, Bolander (MBG); near Mendocino, Mendocino Co., May 1898, Brown 732 (MBG); no definite locality, Douglas (GH, probable Type); Tassajara Hot Springs, Monterey Co., June 1901, Elmer 3289 (MBG); Mount Hamilton, Santa Clara Co., June 1903, Elmer 5023 (MBG); Marin Co., April 4, 1921, Epling 5233 (MBG); no definite locality, 1846, Fremont 149 (MBG); Lagunitas, Marin Co., April 28, 1918, Grinnell (MBG); Smith Creek, foot of Mt. Hamilton, Santa Clara Co., May 10, 1907, Heller 3518 (MBG,ANSP,FM); damp soil in ditch along highway about 5 mi. south of Calistoga, Napa Co., April 12, 1924, Heller 13837 (MBG); between Santa Rosa and Agua Caliente, Sonoma Co., April 22, 1902, Heller & Brown 5343 (MBG); Mt. Tamalpais, April 10, 1906, Hobson (MBG); Napa Co., Mar. 1852, Thurber 548 (MBG,FM); San Luis Obispo, May 9, 1882, Jones 2660 (MBG).

# 12. T. macrophylla var. velutina (Greene) Larisey, comb. nov.

T. californica var. velutina Greene in Erythea 1: 81. 1893.

T. velutina Greene in Erythea 3: 19. 1895.

T. gracilis var. velutina Jepson, Man. Fl. Pl. Calif. 515. 1925.

As the species except somewhat stouter though smaller throughout, and with a more silvery-silky appressed pubescence.

Distribution: California.

CITATION OF SPECIMENS:

CALIPORNIA: open flat 1 mi. south of Lagunitas, April 20, 1930, Bracelin 10 (MBG); Crystal Springs Lake, San Mateo Co., May 1903, Elmer 4824 (MBG); Mount Hamilton, July 1891, Greene 32762 & 3 (MBG,ND,TYPE of T. velutina Greene); Mount Hamilton, Santa Clara Co., May 31, 1907, Heller 8666 (MBG, ANSP,FM); mountains, San Diego, Aug. 1879, Oroutt 594 (MBG); Santa Crus Mtns., 1888, Parry (MBG); warm slope, Cuyamaca Lake area, San Diego Co., May 18, 1935, Purer 6616 (MBG).

# 13. T. gracilis Howell in Erythea 1: 109. 1893.

Plant 4–8 dm. high, sparingly strigose throughout; stem erect, slender, branches spreading; stipules broadly ovate-cordate to lanceolate, 1–2 cm. long; petioles 2–3 cm. long; leaf-lets obovate to oblanceolate, 3.5–5.5 cm. long, 2–3 cm. broad; racemes loose, 1–1.5 dm. long; bracts broadly ovate, 0.7–1.2 cm.

long, semi-persistent; pedicels 0.5-1 cm. long; calyx silky villous; pods densely villous, recurved, divaricate, lomentaceous, 4-5 cm. long.

Distribution: Oregon.

CITATION OF SPECIMENS:

OREGON: summit of lower Siskiyou Mtns., July 3, 1902, Cusick 2927 (MBG); Corvallis, May 1922, Epling 5615 (MBG); Waldo, April 1892, Howell (CAL); Waldo, July 1894, Howell 1495 (MBG, ANSP, CAL).

14. T. gracilis var. argentata (Greene) Jeps. Fl. Pl. Calif. 515. 1893.

T. argentata Greene in Erythea 3: 18. 1899.

As the species except silvery-canescent throughout, and having somewhat longer stipules.

Distribution: California.

CITATION OF SPECIMENS:

CALIFORNIA: Modoc Co., 1893, Baker (ND, TYPE of T. argentata Greene); Forestdale, Modoc Co., Aug. 14, 1899, Baker (MBG, ANSP, WYO, CAL); near Egg Lake, Modoc Co., Aug. 1894, Baker & Nutting (CAL, WYO).

 T. gracilis var. venosa (Eastw.) Jeps. Man. Fl. Pl. Calif. 515, 1925.

T. venosa Eastw. in Bull. Torr. Bot. Club 32: 198. 1905.

As the species except glabrous and somewhat more delicate throughout, stipules more foliaceous, and leaflets more conspicuously veined.

Distribution: Oregon and California.

CITATION OF SPECIMENS:

OREGON: Grave Creek, May 14, 1889, Hammond 74 (MBG); open woods on trail to Tennessee Pass 2 mi. from Kirby, April 20, 1926, Henderson 5981 (MBG).

CALIFORNIA: Dunsmuir, Siskiyou Co., July 23, 1912, Eastwood 1319 (MBG); Shasta Springs on road to McCloud, May 27, 1923, Eastwood 11865 (MBG); between Lamoine & Williams ranch on state highway in yellow pine and oak belt, Shasta Co., June 19, 1919, Heller 13250 (MBG); McCloud Fork, Shasta Co., April 24, 1913, Smith 110 (MBG).

#### DOUBTFUL SPECIES

T. subglabra Henderson in Rhodora 32: 26. 1930.

The type specimen of this species was not available; from the description it appears to be *T. gracilis* var. venosa.

# GENERAL INDEX

New combinations are printed in **bold face** type; synonyms in *italics*; and previously published and accepted names in ordinary type.

1	Page		Page
Baptisia frazinifolia	249	gracilis	
Hugeri	248	gracilis var. argentata	
mollis (Michx.) DC	248	gracilis var. venosa	
mollis (Michx.) Nutt	248	gracilis var. velutina	
Cytisus rhombifolius	249	Hugeri	
Drepilia	246	macrophylla	. 255
Podalyria mollis	248	macrophylla var. velutina	
Scolobus	246	mollis	
Thermia	246	montana	. 253
rhombifolia	249	montana subsp. ovata	. 254
Thermopsis	246	ovata	. 254
angustata	253	pauoiflora	
annulocarpa	250	pinetorum	. 252
arenosa	251	rhombifolia	. 249
argentata	257	rhombifolia var. annulocarpa	. 250
oalifornica	255	rhombifolia var. arenosa	. 251
californica var. velutina	256	robusta	. 255
caroliniana	247	stricta	. 253
divaricarpa	251	subglabra	. 257
fabacea (Pall.) DC. ex Hooker	253	velutina	. 256
fabacea (Pall.) DC. ex Torr		venosa	. 257
fraxinifolia		xylorrhisa	. 254

